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THE

AMERICAN

# JOURNAL OF OBSTETRICS

AND

DISEASES OF WOMEN AND CHILDREN.

EDITED BY

PAUL F. MUNDÉ, M.D.

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and  
PHILADELPHIA OBSTETRICAL SOCIETY.

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## ORIGINAL COMMUNICATIONS.

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### PATHOGENY OF INFANTILE PARALYSIS.

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By MARY PUTNAM JACOBI, M.D.

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(Paper read before the New York County Medical Society, December 22, 1873.)

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THERE is probably no other affection than infantile paralysis which offers so remarkable a contrast between the frequency of its occurrence and general agreement in regard to the description of its symptoms, and the extreme rarity of opportunities that have been offered for its anatomical investigation. Brunniche<sup>1</sup> observed seven cases in one year in a general clinic; and in the same length of time I have myself observed thirteen cases of paralysis in children, of which nine were true infantile paralysis. West<sup>2</sup> gives a table of thirty-two cases; Millier,<sup>3</sup> of twenty-four. Duchenne fils<sup>4</sup> tabulates observations of seventy cases. The books of Dr. Knight's hospital, of this city, contain, in the space of two years, records of one hundred cases of paralysis, of which nearly two-thirds belong to the special affection

<sup>1</sup> Journal für Kinderkrankheiten, Bd. 36, 1861.

<sup>2</sup> Children's Diseases, 1860.

<sup>3</sup> Diseases of Children, 1868.

<sup>4</sup> Archives Gén., 1864.

that occupies us. Volkmann,<sup>1</sup> who gives no table, says that he has seen over one hundred cases; and Barwell<sup>2</sup> makes an analogous assertion.

Nevertheless, the number of autopsies recorded since Underwood first described the disease, in 1789, is not more than twenty-seven, if limited to children, or twenty-nine, if we include two cases of quite analogous disease observed in the adult. Even these few autopsies are not all known to even recent writers on the subject. In 1860, Heine,<sup>3</sup> in his second edition, knew of but three—those by Hutin, Longet, and Fliess. In 1864, Laborde<sup>4</sup> asserts that but four autopsies are known to science—the two made by Rilliet and Barthez, one by Fliess, and one by Duchenne and Bouvier. To these he added the two that formed the basis of his own monograph. In 1867, Dr. Taylor, of New York<sup>5</sup>, observes that nothing satisfactory has been discovered in regard to the pathological anatomy of infantile paralysis. In 1871, Gerhardt<sup>6</sup> quotes only four cases—those of Hutin, Longet, Behrend, and Recklinghausen. In 1870, Meigs<sup>7</sup> quotes these four, the two of Laborde, and one by Hammond (*Journ. of Psych. Med.*, 1851), and is unacquainted with any others. In 1868, Radcliffe quotes six cases, and affirms them to be all negative in result, including the two of Laborde.<sup>8</sup>

In 1872, Smith, basing his opinion upon the same cases, says that nothing satisfactory is known.<sup>9</sup> Finally, as late as 1873, Adams<sup>10</sup> asserts that only three autopsies have been recorded—the two by Rilliet and one by Fliess, to which he adds one by himself, also negative in character. Since Laborde's cases in 1864, I am aware of fourteen that have been published, and of these only two, one by Hammond and one by Adams, are known to or at least mentioned by the authors just named. In the real or supposed absence of sufficient data to form a positive theory, conjecture has run wild in framing hypotheses. In regard to them, it is useful to recognize three distinct phases of opinion, corresponding to successive anatomical discoveries.

<sup>1</sup> Sammlung klinischer Vorträge, No. I, 1870.

<sup>2</sup> Lancet, 1872.

<sup>3</sup> Die Kinderlähmung, 1860. Zweite Auflage.

<sup>4</sup> Paralyse de l'Enfance, 1864.

<sup>5</sup> On Infantile Paralysis and resulting deformities.

<sup>6</sup> Lehrbuch der Kinderkrankheiten, 1871. <sup>7</sup> Diseases of Children.

<sup>8</sup> Reynolds' System of Medicine. <sup>9</sup> Diseases of Children.

<sup>10</sup> On Club Foot.

In the first period, opened by Underwood, in 1789, the disease was defined as essential, *i.e.*, as unaccompanied by any structural lesion whatever. This is the well-known opinion of Rilliet and Barthez, and is maintained at much later dates by Kennedy,<sup>1</sup> West,<sup>2</sup> Bierbaum,<sup>3</sup> Vogel,<sup>4</sup> Bouchut,<sup>5</sup> Kétli,<sup>6</sup> Politzer,<sup>7</sup> Elischer,<sup>8</sup> Barwell,<sup>9</sup> Braum,<sup>10</sup> and Adams,<sup>11</sup> the last seven authors having written at various dates between 1871 and 1873. Barwell rather emphatically denounces the existing excessive tendency to localize infantile paralysis in the spinal cord, and reaffirms the essential, functional, peripheric nature of the disease. On the other hand, Drs. Taylor,<sup>12</sup> Smith, and to a certain extent Meigs, imitate, to-day, the reticence of Marshall Hall,<sup>13</sup> in 1836, who declared himself, from lack of testimony, unable to form an opinion. Roth,<sup>14</sup> who gives a careful résumé of several autopsies, and even Cornil,<sup>15</sup> who has himself contributed one of the best known, continue this reserve.

Brown-Séquard, in 1860<sup>16</sup> and 1861,<sup>17</sup> classed the "so-called" essential paralysis of children, among reflex paralyses, dependent upon peripheric irritation, and characterized anatomically by absence of all lesion in the spinal cord. Echeverria, in 1861,<sup>18</sup> re-emancipated this doctrine, the latter part with much more emphasis than his master had done, and the theory was accepted with certain avidity by many English writers, as Churchill, Coley, and others, who seem to have a national preference for any theory of disease that evades the necessity of post-mortem examinations. A second modification of the essential doctrine is represented by Bouchut, who, from the essential paralyses, separates others called myogenic, on account of muscular lesions which the author considers primitive.<sup>19</sup>

Much before this time, however, attention had been drawn to

<sup>1</sup> Dublin Quarterly, 1850.    <sup>2</sup> Diseases of Children, 1848. Am. ed. of 1860.

<sup>3</sup> Jahrbuch für Kinderkrank., 1859.

<sup>4</sup> Diseases of Children. Transl. from fourth German edition, Raphael, 1870.

<sup>5</sup> Bull. de Thérap., 1872.    <sup>6</sup> Jahrbuch für Kinderkrank., 1873.

<sup>7</sup> Jahrbuch für Kinderkrank., 1866.    <sup>8</sup> Quoted by Kétli.    <sup>9</sup> Loc. cit.

<sup>10</sup> Compendium für Kinderkrank., 1871, p. 161.    <sup>11</sup> Loc. cit.

<sup>12</sup> Infantile Paralysis, 1867.    <sup>13</sup> Lectures on Nervous Syst., 1836, p. 81.

<sup>14</sup> Paralysis in Infancy, Lond., 1869.

<sup>15</sup> Manuel d'Histol. Path., 1873, p. 637. (2<sup>e</sup> Partie.)

<sup>16</sup> Central Nervous System.    <sup>17</sup> Lectures on Paraplegia.

<sup>18</sup> Am. Med. Times, 1861, vol. ii. p. 315.

<sup>19</sup> Traité des Maladies des Enfants, 1862.

the spinal cord as the real seat of the infantile paralysis, and of some material lesion which should be its proximate cause. As I believe has invariably been the case in the study of diseases of the nervous system, this lesion was at first located in its blood-vessels, and the paralysis attributed to a congestion of the spinal cord, or to hemorrhage, capillary or otherwise, into its substance. This opinion was advanced by Heine as a plausible conjecture, supported however by the assertions of Muller, Sandras,<sup>1</sup> Warnatz,<sup>2</sup> and Vogt,<sup>3</sup> and with the autopsy of Fliess.<sup>4</sup> It was reaffirmed by Eulenburg in 1859,<sup>5</sup> although in his treatise on Nervous Diseases published in 1872, he is much less positive. He assigns a central origin to the paralysis, but will venture no conclusions concerning the nature of the lesion. Brunniche<sup>6</sup> and Radcliffe,<sup>7</sup> on the other hand, do not hesitate to describe this lesion as congestion, and Adams admits a slight congestion as the only alternative to the theory of purely functional alteration.

Dr. Jacobi, in his lectures on dentition, partly combated Heine's theory as too exclusive, nevertheless inclined to admit its correctness in a large number of cases, and even assumed a spinal hemorrhage as the lesion which would correspond most completely to the symptoms, and especially to the mode of invasion of infantile paralysis. Mauthner, in 1844,<sup>8</sup> knew no other cause for sudden paralysis in children than cerebral or spinal apoplexy.

In the *Lancet* for 1870, Clifford Albutt emphatically rejects a "reflex" origin for infantile paralysis, and ascribes the disease, in some cases at least, to spinal hemorrhage. He relates a case, not however of infantile paralysis, but of hemorrhage into the cervical cord, of which the child immediately died. Hayem,<sup>9</sup> in his thesis on Intra-rachidian Hemorrhages, repeats this case, and observes that, had the hemorrhage occurred in the lumbar instead of the cervical cord, the child might have sur-

<sup>1</sup> Schmidt's Jahrbücher, Bd. 80.    <sup>2</sup> Schmidt's Jahrbücher, Bd. iv., suppl.

<sup>3</sup> Die essentielle Lähmung der Kinder, Bern, 1858.

<sup>4</sup> Journal für Kinderkrankheiten, Bd. xiii.

<sup>5</sup> Archiv Virch., 1859.

<sup>6</sup> Loc. cit.

<sup>7</sup> Loc. cit.

<sup>8</sup> Die Krankheiten des Gehirns und Rückenmarkes bei Kindern, 1844.

<sup>9</sup> Thèse de Concours, 1872.



vived and offered an apparently typical case of infantile paralysis.

Finally Salomon, in 1868,<sup>1</sup> ascribes the paralysis to an "exsudation process" in the spinal membranes, by which the cord is more or less compressed.

In a third period, researches have been made upon the nervous elements of the cord—researches for the first time conducted by means of the microscope—and which have founded an entirely new school of doctrines concerning infantile paralysis. Yet in this school are several different sects. Laborde originally located the lesion in the anterior columns and anterior roots, and is supported in this by Cornil, who communicated a case to the Société de Biologie in 1863. Gerhardt follows the French pathologists,<sup>2</sup> and Meigs<sup>3</sup> admits sclerosis of the anterior columns and roots to be, at least, a coincidence in cases of long standing. On the other hand, Charcot,<sup>4</sup> Joffroy, Parrot, Prevost,<sup>5</sup> Vulpian,<sup>6</sup> Roger, and Damaschino,<sup>7</sup> and Lockhart Clarke<sup>8</sup> affirm, as the result of new autopsies published by them, that the essence of infantile paralysis consists in an inflammatory atrophy of the cells in the anterior horn of gray substance, especially on its outer side. On the authority of these same autopsies, this view of the disease is admitted as highly probable by Meyer<sup>9</sup> and Volkmann<sup>10</sup> in Germany, Hillier<sup>11</sup> in London, Hammond<sup>12</sup> in New York. In Paris, Duchenne, father<sup>13</sup> and son,<sup>14</sup> had, in 1861 and 1864, advanced nearly this theory as a most plausible hypothesis, before anatomical demonstration could be obtained, and ranked infantile paralysis with the spinal paralysis of adults, and even with its acute ascending form, and also with glossio-labio-pharyngeal paralysis. But since the publication of these facts, Dujardin Beaumetz has

<sup>1</sup> Journ. für Kinderkrank., 1868.

<sup>2</sup> Lehrbuch für Kinderkrankheiten, p. 699.      <sup>3</sup> Loc. cit.

<sup>4</sup> Archives de Phys., 1870.    Revue Phot., 1872.

<sup>5</sup> Comptes rendus Soc. de Biol., 1866.

<sup>6</sup> Archives de Phys., 1870.      <sup>7</sup> Gaz. Méd., 1871.

<sup>8</sup> Med. Chir. Trans., 1868.

<sup>9</sup> Journ. für Kinderkrank., 1868.

<sup>10</sup> On Electricity. Translated by Hammond.

<sup>11</sup> Loc. cit.

<sup>12</sup> Loc. cit.

<sup>13</sup> Diseases of Nervous System.      <sup>14</sup> Electr. local., 1861.

<sup>15</sup> Archives Gén., 1864.

placed infantile paralysis among cases of acute myelitis,<sup>1</sup> and Hallopeau has described infantile paralysis as a form of myelitis, to be associated closely with progressive muscular atrophy, as a parenchymatous inflammation of the anterior gray substance, and thus notably distinguished from the diffused inflammations that affect the neuroglia and result in sclerosis.<sup>2</sup> "If," he writes, "we have been able to localize in the posterior cornua the organ of locomotor ataxia, in the same manner we have the right to consider the anterior gray substance as the central organ of muscular atrophy. Wherever this exists alterations of the anterior horns have been found on competent microscopic examination; and these amyotrophic lesions are to be attributed to the same cause, whether they appear in the course of a diffused myelitis, or under the form of progressive muscular atrophy or of infantile paralysis." So Charcot, in his *Lessons on the Nervous System*, classes together hematomyelic, acute central myelitis, and infantile paralysis, as peculiar irritative affections of the central gray substance of the spinal cord, necessarily resulting in muscular atrophy. In these affections, of which infantile paralysis is the most perfect type, everything leads to the belief that the primitive lesion is in the nerve cells, as distinguished from the neuroglia and reticulum of nerve fibres.<sup>3</sup> Vulpian announces the same doctrine in his *Cours de l'Ecole de Médecine*. In the *Revue Photographique* for the same year is published a lecture by Charcot upon the group of myopathies of spinal origin, a group almost exactly corresponding to that framed in 1861 by Duchenne. Finally, encouraged by this definite declaration of doctrine on the part of the illustrious master, Pettitils has sustained, in 1873, an inaugural thesis under the title, *acute atrophy of motor cells*, which is described as the primitive lesion universally existing in the diseases of this group, namely, glosso-labio-pharyngeal paralysis, progressive muscular atrophy, general spinal paralysis of the adult, and infantile paralysis.<sup>4</sup>

Nothing can be more complete than the opposition between this opinion and that formerly given, and which has so widely

<sup>1</sup> De la Myélite Aigue, Thèse de Concours, 1872.    <sup>2</sup> Archives Gén., 1871.

<sup>3</sup> Leçons à la Salpêtrière, 1872.

<sup>4</sup> Thèse de Paris, 1873. Considérations sur l'atrophie aiguë des cellules motrices.

prevailed, that every writer on the subject has felt obliged to refer to the disease as either essential, or at least as the "so-called" essential paralysis of children.

Since the change of opinion—which, however, is yet very far from universal, even among competent authorities—is based on the results of autopsies, it is necessary to examine these results in detail to ascertain how far they justify such a revolution, or what objections may be made to them.

The appearances described are referred either to the paralyzed muscles, the spinal cord, or both, and may be grouped into three classes. In the first nothing was found; in the second, atrophy of muscles, and lesions discovered in the cord, that, however, offered no peculiarity corresponding to the peculiar symptoms of infantile paralysis; in the third, finally, lesions were found involving one or more of the peculiar elements of the cord, and analogous to those discovered in other cases of disease, which resembled infantile paralysis in loss of voluntary motion, and in atrophy of the muscles paralyzed.

1st. *Negative Autopsies.*—There are seven autopsies on record, whose results are said to be completely negative. Of these, three—Rilliet's,<sup>1</sup> and one by Duchenne and Bouvier, may be immediately set aside, since it is admitted that no microscopic examination was made. We think that to-day it would be superfluous to observe, as a recent English writer does with considerable naïveté, that "the researches of Mr. Lockhart Clarke have shown that the microscope *may be* of very great assistance in unravelling the pathology of the spinal cord." A fourth negative case is that reported by Mr. Adams, in his Treatise on Club-foot. He says, that after a very careful examination, he was unable to detect any morbid condition of the spinal cord, but does not specify whether the examination was microscopical, nor how long a time had elapsed since the occurrence of the paralysis. A fifth case, more important, was published by Bouchut, in the *Union Médicale* for 1867, where a microscopical examination, made by Robin, could discover nothing in the cord. Finally, in a very recent number of the *Jahrbuch für Kinderkrankheiten* for 1873, Kétli quotes two autopsies made by Elischer upon paralyzed children who had succumbed to vari-

<sup>1</sup> Gaz. Méd., 1851.

ola. Microscopical examination of the cord gave completely negative results, but the muscles offered examples of two kinds of degeneration, the fatty and the colloid. Kétli considers these the most exhaustive researches that have been made, and as completely justifying Bouchut's description of myogenic paralysis, characterized by primitive granular fatty degeneration of muscular fibre. This view is analogous to that advocated by Friedreich in regard to progressive muscular atrophy, a disease so frequently associated with infantile paralysis by authors who assign a central nervous origin to both.<sup>1</sup> The latter authors are nearly all more recent than the former.

Among the six negative cases, therefore, while four are important, only one can be considered completely satisfactory—that reported by Bouchut.

Of the next seven cases, five are old, among the first on record. They are repeated in almost every monograph or chapter on infantile paralysis. The first case is recorded by Longet in a girl with a club-foot, who died at the age of eight, the muscles, sciatic nerve, and its anterior roots on the corresponding side, were all atrophied. In the second case, from Hutin, paraplegia occurred at 7; death at 45; and at the autopsy the lower part of the cord was found atrophied. In the third and fourth cases the paralysis was evidently secondary to general organic disease of the cord; in the one case spinal meningitis (Behrend), in the other tubercle (Recklinghausen). These latter cases can only show that pressure exercised upon the cord may produce paralysis whenever the motor organs of the cord have become involved. They, of course, cannot be involved

<sup>1</sup> Friedreich gives the following table of authors in two classes, of which the first assigns a muscular, the second a nerval, origin to the disease.

<i>Muscular.</i>	<i>Nerval.</i>
Meryon. Med.-Chir. Trans., 1852-1866.	Romberg. Lehrbuch für Nerven-
Wachsmuth. Zeits. f. rat. Med., 1855.	krank.
Oppenheimer. Ueber prog. fett. musk., 1855.	Fromman. Deutsche Klinik, 1857.
Hasse. Krankheiten des Nerven Syst., 1869.	Virchow. Handbuch, 1854.
Meyer. Wiener Wochenschrift, 1855.	Jaccoud. Chir. Méd., 1867.
Friedberg. Pathol. und Therap. Mus. kellähm., 1858.	Ollivier. Thèse de Concours, 1869.
Roberts. Wasting Palsy, 1858.	Erb. Deutsches Archiv, 1867. Bd. v.
	Trousseau. Chir., 1868.
	Charcot. Arch. de Phys., 1869.
	Clarke. Med. Trans., 1866-1868.
	Hayem. Arch. de Phys., 1869.

as most frequent explanation of ordinary infantile paralysis. The two cases of simple atrophy correspond to the lesions found after section of nerves.

The fifth autopsy of this class is that so often quoted from Fliess, recorded in the *Journal für Kinderkrankheiten* for 1849. A child, 5 years old, having passed a restless night, was found in the morning with the left arm paralyzed. No adequate cause for the paralysis was discoverable, but the examination showed in the mouth some decayed milk-teeth. A few days later the child was killed by a kick from a horse, and at the autopsy was seen a notable dilatation of blood-vessels around the roots of the left brachial plexus. This vascular turgescence extended to the shoulder, the neck, and submaxillary region.

The cerebral meninges were congested, as a result of the blow. No microscopic examination was made of the cord.

Fliess attributes the congestion to the irritation of the decayed teeth, and the paralysis to the pressure of the dilated blood-vessels upon the roots of the brachial plexus. The examination was too incomplete to permit this explanation to be accepted as decisive; but this case, like those of Longet and Hutin, offers no contradictions with later autopsies.

The sixth case is reported by Hammond in the first<sup>1</sup> volume of the *Journal of Psychological Medicine*. Paralysis of the left leg had lasted four years, and at the autopsy was found an encysted clot, in the left anterior column of the lower part of the dorsal region. The history of the début of the disease is not given, nor are we told whether the cord showed any evidence of myelitis, or to what symptoms the patient succumbed.

It is remarkable that this is the only case of infantile paralysis in which evidences of a circumscribed hemorrhage have been found in the cord. The case related by Clifford Albutt is the following: A healthy child of seven months was lifted up rather roughly by the mother, fell forward heavily in her arms, and a few minutes later was paralyzed in its four limbs. Death occurred by paralysis of the respiration, and at the autopsy were found two hemorrhagic clots in the cervical spinal cord, the smaller in the left posterior horn, the larger in the right posterior.

<sup>1</sup> *Journal of Psychological Medicine*, vol. i. p. 51.

In quoting this case, Hayem refers to another, the seventh in our series, where, in a person of twenty-four years of age, who had been paralyzed when two years old, he found an infiltrated hemorrhage in the lumbar cord.

The third class of autopsies of presumed infantile paralysis, are all recent, and include twelve cases, in all of which some lesion was found in the spinal cord.<sup>1</sup>

The first autopsy was published by Cornil in 1863. A woman of forty-nine had become paraplegic at two years of age, and could not walk for six years. After that, was enabled to walk, though painfully, by means of the muscles of the thighs, although those of the leg and foot were atrophied, especially on the left side. This false restoration of motor power I have observed many times myself. After death by cancer of the plexus, the autopsy discovered complete fatty substitution of the muscles of the left leg, and incomplete on the right; atrophy and fatty degeneration of the sciatic nerves, and diminution in the thickness of the anterior columns of the lumbar cord. A great number of amyloid corpuscles were strewn through the anterior columns. The cells of the cornua were intact.

The next two are those often quoted, published by Laborde in 1864, in which the anterior columns of the cord, translucent to the naked eye, were found by microscopical examination to be extensively sclerosed. In the mass of conjunctive elements, the nerve tubes had atrophied, many had completely disappeared, many that remained were varicose. This was especially noticeable in the first case, a child of two years, who at the age of eight months, after a short fever, was seized with general paralysis, soon limited to the lower limbs. In the second case the child had fever and repeated convulsions at a year old, then became paraplegic. Before death, a year later, atrophy and consequent deformity had made much progress. In this case death occurred from pneumonia, and at the autopsy was found a remarkable vascularization of the spinal pia mater, and of the superficial part of the anterior column. The nuclei of the capillaries were multiplied, and the walls of these vessels surrounded by exudation corpuscles, which also were infiltrated

<sup>1</sup> A table of these same cases has been published by Dr. E. C. Seguin, in the *N. Y. Medical Record* for last January.

in great numbers among the nerve tubes. The latter were varicose and broken in many places, in many others had entirely disappeared. In both autopsies the elements of the cornua were noted as perfectly healthy, as were also those of the paralyzed muscles.

The fourth autopsy is by Prevost in 1866 (Soc. Biol.). The history of the paralysis could not be obtained, but at 78, the time of death, the left leg was paralyzed, muscles soft and flaccid, the foot in talipes calcaneus. After death these muscles were found to be completely converted into fat. The inter-muscular nerve-fibres were unaltered. In the nervous centres, besides a recent purulent cerebro-spinal meningitis, not diagnosed during life, was found a marked atrophy of the anterior horn on the left side. The external portion was converted into connective tissue, colored red by carmine, and in whose meshes hardly a nerve-cell was to be found. The nerve tubes in the columns or the anterior roots were intact.

The fifth autopsy belongs to Lockhart Clarke, and is published in the *Medico-Chirurgical Transactions* for 1868, as a case of progressive muscular atrophy. The symptoms are those of infantile paralysis; the lesions similar to those found by the author in cases of the latter disease, and consist in foci of granular disintegration in the anterior cornua of the cord, and where the nerve-cells had disappeared.

The sixth case was communicated by Charcot and Joffroy to the Soc. de Biol. in 1869. Sudden general paralysis occurred at seven years, accompanied by a transitory loss of speech. A certain weakness persisted in the four limbs, which amounted to permanent paralysis in the left arm. Death at 32. At the autopsy was found, in the entire length of the cord, a marked alteration of the anterior cornua, with integrity of the anterior columns. In the cornua the motor cells had extensively disappeared, and been replaced by conjunctive tissue. This alteration was chiefly marked in the cervical region on the left side.

The seventh case is from Vulpian, and is detailed in the *Archives de Physiologie* for 1870. Here, as in Prevost's case, was no history. At 66, age of death, the left leg was atrophied and paralyzed, and there was a coxo-femoral dislocation, which the patient affirmed existed from infancy. After death the paralyzed muscles were found to be converted into fat, and the

spinal cord, scarcely altered to the naked eye, showed under the microscope a species of atrophy of the gray substance in lower lumbar cord, and a species of sclerosis of the right anterior horn. At this point the section was less colored by chromic acid, more by carmine; the majority of the nerve-cells in the external path of the horn had disappeared, and their place was occupied by new connective tissue, and enlarged blood-vessels. Besides, there was very superficial sclerosis of the anterior columns.

The eighth case appeared also in 1870, and is by Parrot and Joffroy. The autopsy was made on a child of three years, completely paralyzed in the left lower extremity, incompletely in the right. The paralyzed muscles contained an abnormal quantity of conjunctive tissue, but were not fatty. The alterations of the anterior horns in the lumbar were precisely similar to those of Vulpian, and their relative extent on the right and left side corresponded to the degree of paralysis. There was noticed besides, atrophy of the axis cylinders constituting the nervous reticulum, to be distinguished from that of the neuroglia; atrophy and sclerosis of the anterior columns; and alteration of vessels, whose lymphatic sheaths were crowded with fat granules. The sclerosis coincided in extent with the lesions of the cornua, but the alterations of the vessels extended much further up the cord.

In 1871 appeared the memoir of Roger and Damaschino, containing the record of three new cases. In the first case, left hemiplegic paralysis at two years old, rapidly limited to the left deltoid, which became much atrophied. Death two months later of hemorrhagic scarlatina, during which an attack of paraplegia, principally at the right. The deltoid was found in simple atrophy; the left anterior cervical roots congested and atrophied, and in the cord various foci of alterations in left anterior cervical, and also in the right lumbar region. The microscopic lesions resembled those just described; the cells were atrophied, and nerve tubes in the roots deprived of myeline; the vessels were dilated, and their walls covered with fatty granulations, and the anterior columns were sclerosed; this about equally on the two sides. The atrophy of the roots extended all along the cord. The foci of alterations were softened and visible to the naked eye.



In the second case paraplegia occurred at two years, during a discrete variola. Death six months later of broncho-pneumonia. Examination of muscles showed some degree of fatty substitution; of the cord, two foci of softening in the anterior part of the gray substance of lumbar region, one two millimetres in diameter, another larger. In these foci the tissue was almost diffuent, the microscopic lesions the same as in the other cases, and these extended to three and a half centimetres above, where no alteration was visible to the naked eye. The fatty degeneration of the blood-vessels was excessive, a reticulum of conjunctive fibres occupied the centre of the foci, from which the cells had disappeared, and this was surrounded by a true cyst wall. No distinct hemorrhage complicated this circumscribed myelitis. The anterior columns were sclerosed. In the third case, a child of three years died thirteen months after the invasion of paraplegia, with the ordinary symptoms. Foci existed in the lumbar region similar to those in the preceding case, and surrounded also by indurated conjunctive tissue. But microscopic lesions of the anterior cornua and columns extended all along the cord.

On account of these complex alterations—degeneration of blood-vessels, formation of exsudation corpuscles, atrophy of nerve cells and tubes, hyperplasia of conjunctive nuclei, secondary sclerosis of anterior columns,—the authors admit a myelitis starting, not from the motor cells, as Charcot would have it, but from the interstitial tissue of the cord.

The twelfth observation is due to Lancereaux, and is published by Petitfils in his Thesis for 1873. Paralysis of the left arm at two or three years old, resulting in considerable atrophy. Death at 18. The muscles were found in simple atrophy, the left anterior horn was atrophied in the cervical region, from disappearance of external group of motor cells, and substitution of conjunctive tissue. A certain amount of atrophy existed in the left half of the lumbar region. There was no antero-lateral sclerosis.

From comparison of these twelve observations, by far the most important on record, it results that five lesions have been found in the cord in cases of unquestioned or presumed infantile paralysis. 1st. Atrophy of the nerve cells occupying the external portion of the anterior horn, and atrophy of the nervous reticu-

lum formed by their prolongations.<sup>1</sup> This in nine cases. 2d. Atrophy of the anterior roots, and sclerosis of the anterior columns, observed alone in the three first cases of this series published, and coinciding with cellular atrophy in four of the other cases, most marked in the three that offered foci of softening. 3d. Proliferation of conjunctive nuclei, occupying the place of the nerve cells; in the nine cases these were atrophied. 4th. Dilatations of the blood-vessels, and fatty degeneration of their walls, described in four cases. It is quite possible that these existed in some of the others, where they are not described, because they had not been expected. 5th. Distinct foci of softening limited to the anterior cornua on the side corresponding to the paralysis, and proportioned in extent to the degree of paralysis. These only described in the three observations of Roger and Damaschino, where the autopsy was made two, six, and twenty-three months after the occurrence of the paralysis, and when death had been occasioned by febrile disease. In the two last the focus of softening surrounded by an indurated border, which had not had time to develop in the first case.

On the whole, therefore, the number of cases of infantile paralysis, in which lesions of the motor sections of the cord have been found, greatly preponderate over the negative cases. All recorded cases with microscopical examination, must, however, be taken into account, and their variations must be explained by variations: 1st, in the form of the disease; 2d, in the length of time intervening between the paralytic accidents and the autopsy.

Different cases of infantile paralysis vary: 1st, in their mode of invasion; 2d, in their march; 3d, in the age of the subjects.

In regard to the mode of invasion of paralysis in children, I have distinguished nine distinct forms, most of them noticed among the thirteen cases observed by myself, and twenty-four selected at random from the collection at Dr. Knight's hospital.

In the first, the paralysis is absolutely sudden, occurs in the day-time, in the midst of health, while the child is under competent observation. These cases, often represented as typical, are in reality the rarest of all—only twelve out of one hundred

<sup>1</sup> See Boll. Archiv für Psychiatrie, 1873.

and sixty-three cases. I have not seen one, nor is one recorded in West's table of thirty-two cases. There is one among Dr. Knight's cases, four in Illier's table of twenty-four, and seven among the seventy cases tabulated by Duchenne fils; giving a total of twelve in 163 cases. It is well known that the severity of the paralysis bears no relation to the mode of invasion, or these cases might be supposed to be the mildest, which is not, however, true.

In the second form, much more frequent, the paralysis is discovered in the morning, after a perfectly quiet night; eight cases out of my thirty-seven were of this class.

These recall the phenomena of spinal congestion, as described by Brown-Séquard, where the paralysis is aggravated by recumbent position, on account of the gravitation of blood to the spinal meninges, and also by the first assumption of the vertical position, owing to the descent of cerebro-spinal fluid. The latter circumstance, however, would have no influence except in paralysis of the lower extremities.

In the third form febrile symptoms occur, generally beginning in the evening and lasting all night, or else two to three days. When the fever is slight, these cases closely resemble the morning paralysis of the second class. Eleven of Duchenne's cases were of this form. He says that the older the patient the greater is the duration and severity of the fever.

In the fourth form the paralysis is preceded by convulsions instead of fever. This in four of my thirty-seven cases.

In the fifth class the paralysis occurs in the course of another disease. In one of my cases the paralysis was observed after the child had been long kept in bed with purulent conjunctivitis; in two others occurred suddenly during an attack of cholera infantum. In one of Roger's cases, a child, already paralyzed in the left deltoid, became paraplegic during the hemorrhagic scarlatina that caused her death, and at the autopsy, nineteen days later, a focus of softening was found in the lumbar region of the cord, presenting the same microscopic lesions as the cervical focus that corresponded to the deltoid paralysis.

In a seventh class the paralysis is preceded alone by vomiting. I had two cases of this kind, in one of which the vomiting lasted two weeks and was followed by crossed hemiplegia. This case might at first be attributed to a cerebral origin, but

eight years later, the muscles were atrophied without retraction, and failed to contract under faradaic electricity.

In an eighth class some mechanical accident has occurred. In none of the cases I have examined was the paralysis immediate, but preceded by accidents that were the more direct consequence of the paralysis. These are easily overlooked, without special inquiry. Thus in one of my cases, the mother asserted at first that the child had been paralyzed ever since he fell down stairs, but afterwards admitted that he was in bed a week, with high fever, before the paralysis was noticed.

Only two other such cases are on our list: in one, the child nearly fell from its nurse's arms, was caught violently by the lower extremities, and became paraplegic about a month later; in the other, fell from a wagon, and was lame in two days. In all statistics mechanical accidents are very much in the minority, a fact in striking opposition to their frequency in the etiology of meningeal or medullary hemorrhage.

We separate a ninth class, in which, with the usual début of infantile paralysis, symptoms are observed whose absence is generally conspicuous. This is a more important class than the others. In one of our cases the child, at the age of two and a half years, had a febrile attack, during which a physician prescribed morphine, after which she slept uninterruptedly for twenty-four hours. On awakening, she was found to be completely paralyzed and anæsthetic in both lower extremities. For two days she remained insensible to the prick of a pin, and for eight days suffered from retention of urine. This case resembles lumbar myelitis. In another case, paralysis of the left leg was preceded for two days by vague indisposition, and accompanied by fever, retention of urine, opisthotonus, and general hyperæsthesia. The absence of any modification of the sensibility, or of the action of the bladder, in the great majority of cases of infantile paralysis, renders the occasional presence of such symptoms all the more important. One similar case is recorded by West, and two by Hillier.

Although theoretically superfluous, it is often practically useful to remember, that in a tenth class of cases, the paralysis is either congenital, or has been accompanied by marked cerebral symptoms, or has existed at first under the form of hemiplegia, together with facial paralysis; and in the two last, if not in all

three cases, is of cerebral origin, and therefore radically different from true infantile paralysis.

Among the thirteen cases seen by myself, twelve had been diagnosed as infantile paralysis by other physicians, and of these one was congenital and three certainly cerebral. I have based the diagnosis in the latter cases on the following points. First, on the form of the paralysis, which I have never seen hemiplegic, unless the facial nerve had been involved at the beginning.

Duchenne fils gives only one case of hemiplegia, that is not described, and two cases of cross hemiplegia, the latter admitted to be excessively rare. Heine apparently makes a class of nine cases, but in only one did the paralysis involve an upper and lower extremity. It followed a fever of several days, and as Heine did not see the case till years afterwards, a facial paralysis might easily have been overlooked by the parents.

In two of West's cases the hemiplegia was congenital, in two it involved the face, in seven the paralysis was limited to the facial nerve; in five alone was it confined to a leg and arm of one side. In two of these it came on gradually; in one succeeded to remittent fever; in one was preceded by heaviness of the head for several days, and in one the leg was paralyzed fourteen days after the arm.

Although, therefore, the hemiplegic form cannot be said to absolutely exclude infantile paralysis, it is so exceptional as to offer a strong presumption against the existence of that disease. The second point of diagnosis is the coincidence of cerebral symptoms other than the facial paralysis, which certainly must be considered as such. It is curious how often these may be detected in quite a small range of cases. Thus: in one, the hemiplegia appeared after coma during cerebrospinal meningitis. In a second, after a violent convulsion, the face was spasmodically drawn to the opposite side, and the patient, a child of seven, remained for a month in a state of intense maniacal excitement. In a third, developed during convalescence from scarlet fever, the hemiplegia was preceded by paresis during two days, and accompanied for a year by complete aphasia. In the fourth case, where the child, who had presented transversely at birth, offered a paralysis of the muscles of the forearm, principally, and by exception, seated

in the flexors, so that the hand was bent back on the wrist, the extreme localization of the trouble was a point of much resemblance with infantile paralysis, or, as the arm had prolapsed during labor and been replaced, the paralysis might also have been attributed to a peripheric traumatism. But the first hypothesis was contradicted by the presence of an anaesthesia so complete that the child constantly chewed the ends of her fingers, and the second was equally opposed by the complete preservation of faradaic contractility. The reactions to the faradaic current are well known to constitute an important means of diagnosis between cerebral paralysis on the one hand, and those of peripheric or spinal origin on the other. The value of this test has been much disputed, but is, we believe, to-day generally admitted. Duchenne, giving greater precision to the ideas of Marshall Hall, claims to have discovered this test. Bouchut disputes the claim to priority, but admits the value of the test. It is very remarkable, that in infantile paralysis the loss of faradaic contractility is as rapid as is loss of power to respond to electricity after section of a nerve—namely, in thirty-six hours according to Barwell, in six to eight days according to Duchenne. Salomon<sup>1</sup> has especially investigated this matter, and has entirely confirmed the views of Duchenne, except in regard to the absolutely bad prognosis that is implied by complete loss of contractility. It was necessary for Hammond and Radcliffe to discover, as a new fact, that the muscles which failed to react to the faradaic current, would often, though not always, respond to galvanism. In thirty-seven cases that I have examined, all of whose histories contained other indication of cerebral origin, normal faradaic contractility persisted after years of paralysis and excessive atrophy. The same is true of those singular cases of congenital paralysis accompanied by rigid muscular contractions. In all cases on the other hand, where such cerebral symptoms were absent, the muscles completely failed to contract, although their helplessness, atrophy, and flaccidity were not greater than in the first case. Since in muscles atrophied after long standing cerebral paralysis, faradaic contractility persists, and since this completely disappears in infantile paralysis long before atrophy has set in, the phenomenon is clearly independent of the condition of the muscular

<sup>1</sup> *Jahrbuch für Kinderkrankheiten*, 1868.

fibre, and must be connected with that of the nerves. It is observed in diffused chronic myelitis, as well as in infantile paralysis, and Vulpian concludes that lesions of the cord determine in nerves alterations in structure similar to those observed in their peripheric end after section.

It has seemed to me that the possibility of exciting contractions by a very slow interruption of a strong induced current, does not always imply return of power to the nerve. In one case, where, after two days' convulsions, paralysis of the right arm had occurred, soon limited to the deltoid, where it was persisting two years later, an ordinary induced current gave no contractions whatever, but these were obtained with galvanism; and also when the secondary induced current was very slow and jerking, and applied directly to the muscle instead of through the nerve. But after months of treatment with this current, the paralysis remained unimproved.

Another sort of fallacy is due to the derived currents, which excite contractions in antagonistic muscles, that are often mistaken for movements in those through which the current is passing, and which really are too much paralyzed to respond. Thus I have often seen the toes move as the common extensor was faradaized, but it was evident that they moved only in flexion, precisely as when the current was passed directly through the flexors themselves.

Paralysis following diphtheria or other febrile blood diseases, as described by Gubler, must also be separated from real infantile paralysis. Many cases are really due also to different accidents than the one to which they are attributed. Thus S. Weir Mitchell describes a case where a child, shortly after a fall, was found to be lame in the right leg; but it was discovered at the same time that decided atrophy of the muscles already existed, and it was shown that the nerves of the lumbar plexus were compressed by exsudations that had formed during a severe attack of typhlitis.

In regard to the march of the disease, three principal varieties are to be distinguished: in the first, the paralysis completely disappears, either spontaneously or after treatment, in from two days to a few months. Kennedy's famous cases are of this description. Barwell asserts that the majority of cases that came under his observation, are curable when treatment is begun short-

ly after the debut of the paralysis. A similar assertion is repeated by Hitzig and Jurgensen<sup>1</sup> in opposition to the extremely unfavorable prognosis of Volkmann. For the personal knowledge of one such case, I am indebted to Dr. Jacobi. A lady, affected with chronic endometritis, miscarried several times from fatty degeneration of the placenta. At the first living birth the placenta was found to be still partly fatty, and the child was subject for two years to repeated intestinal hemorrhages. These were attributed to an imperfect structure of blood-vessels, analogous to that existing in the placenta. At the age of two years the child was found paraplegic one morning upon awakening. No anaesthesia. In three to four days the paralysis was limited to the muscles of the right leg; in a week these still responded well to both currents. No electrical treatment was used, but ergot administered, and ice applied to the spine. Recovery was complete in two months.

In the second class of cases, the paralysis, at first generalized, becomes limited to a few muscles, and there persists indefinitely. In the third class, finally, the muscles begin very soon to waste, and the atrophy becomes so general and excessive that the limb dangles about like a loosely jointed stick, the famous "*jambe de Polichinelle*" of the French writers. These cases are too well known to require description or even illustration, but their frequency seems to me to have been exaggerated.

Among the twenty-seven autopsies, the muscles were examined in fifteen; were found simply atrophied in six; replaced more or less completely by adipose tissue in eight; and in one offered no appreciable alteration. There is no well-defined relation between the date of paralysis and the invasion of the muscles by fat. It is true, one of the cases above quoted of simple atrophy is Roger's, where the examination was made two months after the date of the paralysis; but on the other hand, Hammond has examined the muscular fibre from the living subject in two cases in which the paralysis had lasted over four years, and found the structure unchanged. According to Charcot, the rapid wasting of muscular fibre within its sarcolemma, with persistence of the striations, is alone characteristic,—fatty substitution is always accidental.

<sup>1</sup> Archiv für Deutsche Klinik, 1873.



In regard to the third variation, that is, in the age of the patient attacked by paralysis, it would seem at first that this is settled by the very designation, "infantile," "dental;" and indeed, to many it is so. All records, however, contain many cases in which the accidents occurred after two years old, hence beyond the period of the first dentition. But, as previously observed, attention has been recently drawn to certain cases of paralysis in the adult where the symptoms completely resemble those of infantile paralysis. In 1861 already, Duchenne described cases of general spinal paralysis in the adult, which he considered as quite analogous to infantile paralysis; and in his third edition he relates four cases that differ, indeed, from infantile paralysis in the presence of rachialgic pains, but resemble it in the rapid invasion, primitive generalization, and subsequent limitation of the paralysis. In the thesis of Petitfils are recorded three cases, observed by Charcot, in adults. The paralysis was discovered in the morning, in one; after twenty-four hours hemiparesis, in a second; after four days vague indisposition, in a third. In one, paralysis was paraplegic from the beginning; in one, generalized at first, afterwards paraplegic; in one, it successively invaded the four limbs. In one there was pain; in one anaesthesia; in one trembling. In all, faradaic contractility disappeared in the paralyzed limbs, which grew cold, and atrophied rapidly for a few weeks, then began to improve, and in one case were completely restored. Meyer relates two cases that have been quoted as examples of paralysis, but which are evidently progressive muscular atrophy. But M. Brown-Séquard has related to me a case, in an adult, which entirely resembled infantile paralysis, with extreme wasting, which was ultimately cured. Cuning<sup>1</sup> has seen a case of general paralysis, occurring suddenly after exposure to cold, with nearly all the negative symptoms peculiar to infantile paralysis, but followed by darting pains in the lower limbs, some spasmodic contraction of their muscles, slight atrophy of the upper extremities, and claw hands. Return of power to walk in three months. I have seen a somewhat similar case at the Mount Sinai Hospital, but of which the termination is still uncertain. A man, having vomited constantly for two weeks without presenting any other symptoms, was seized with paralysis of the arms upon going to a

<sup>1</sup> Dublin Quarterly, 1869.

pump in the court-yard. The next day the paralysis had extended to the lower extremities, and was followed by constant severe pains in the paralyzed limbs. The muscles wasted rapidly; nevertheless, in about three months the paralysis had become limited to the parts of the limbs below the elbow and knee-joints. A year later, the patient was still in this condition, the hands clawed, the feet in slight varus equinus; faradaic contractility abolished in the muscles that remained paralyzed.

Still another case is related with great detail by Bernhardt, in the last number of the *Archiv für Psychiatrie* (1873). In every essential respect it resembles the above, and is considered by the author as identical with the so-called infantile paralysis. A twelfth case is quoted from Lucas Championnière, in Hallopeau's memoir on diffused myelitis, already referred to. Eighteen months before death, the patient, on recovery from confinement, was suddenly affected by general paralysis, ultimately limited to the left lower extremity. She entered the hospital for an attack of typhoid fever, and it was then noticed that the muscles of this limb were extremely atrophied, and that faradaic contractility was abolished in them. The patient succumbed to the fever, and at the autopsy the muscles were found in fatty degeneration, and in the lumbar region of the cord, foci of softening in the two anterior horns. These were analogous to those observed by Roger, also after febrile diseases, in the muscles that remained paralyzed.

In the last January number of the *Archives de Physiologie*, Gombault relates a case quite analogous to these, but attended at first by severe rachialgia. Paralysis remained generalized for two years, but at three and a half years, use of the four limbs was incompletely recovered. Death occurred through some complication, and at the autopsy was found a pigmentary degeneration of the cells in the anterior horns, lesion generalized all along the cord. The anterior roots were atrophied, the anterior columns, and all other parts of the cord healthy. The paralyzed muscles were sclerosed, and the sarcolemmæ generally empty. This valuable autopsy may justly be classed with those already related of infantile paralysis.

It appears, therefore, that the age of the patient cannot be reckoned as an absolutely essential circumstance to the production of the most typical characters of the disease. All that can

be affirmed is, that it is much the most frequent between the ages of six months and two years. On comparing the symptoms of infantile paralysis with the results furnished by autopsies, we find that a certain number among both, one and the other, may be invoked in favor of one or the other pathogenic theories we have enumerated. The sudden invasion, and occasionally complete spontaneous disappearance of the accidents, together with the negative results of four autopsies, have been supposed to prove, now the "essential," *i.e.*, functional character of the disease, now to indicate a transitory congestion of the spinal cord. These two theories are often grouped together, as if supposed to be very nearly identical; as when Adams says that infantile paralysis is either a functional disease, *or* else depends on some slight spinal congestion. But in reality the two ideas are completely distinct. For the hypothesis of spinal congestion, so seriously defended by Radcliffe, presupposes at all events that the lesion, however transitory, is central. Whereas the assertion that infantile paralysis is essential, functional, immediately conveys to many, and is perhaps meant to convey, the idea that only the function of the motor nerves is abolished, and that an essential paralysis is, unless reflex, essentially peripheric. Especially in regard to infantile paralysis has the localization of the affection been considered a proof that the cause of the disease was to be sought on the periphery of the nervous system. Now the function of a nerve is unique and well understood—that of conducting impressions. So long as these impressions, motor or sensitive, continue to be generated, the function of the nerve can only be interrupted by interruption of the road along which the impressions travel; and further, the same cause that suspends the conveyance of one kind of impression must, in the great majority of cases, suspend that of the other, so that a complete motor paralysis, dependent on an affection of a nerve, is nearly always accompanied by anæsthesia. It is true that this is by no means always in proportion to the degree of motor palsy, and a case related by Mitchell may be paralleled by others, where sudden and complete paralysis caused by dislocation of the humerus, was accompanied with scarcely any loss of sensation.<sup>1</sup> Still the rule is the other way, and implies conditions

<sup>1</sup> *Injuries of Nerves*, p. 102.

directly opposed to those of infantile paralysis, where modifications of the sensibility are extremely exceptional.

But further, from the almost mechanical nature of the function of the nerve, it is difficult to imagine an interruption to this function dependent on other than mechanical or, at least, physical conditions, and it is so difficult to demonstrate an immaterial abolition of function, that indeed it has never been done. It is as easy to show that wire may become impervious to the passage of electricity, unless it be severed or clogged by non-conducting substances, as that a nerve whose structure is intact may nevertheless refuse to conduct impressions. Hysterical paralyses and anæsthesias prove nothing in regard to functional alterations of nerves, until it can be shown that the loss of motility or sensation in hysteria be really entirely independent of alterations in the activity of the cells. There are only five cases in which paralysis of a nerve can be positively traced to causes confined to the nerve, when namely it has become inflamed, or has been severed, frozen, contused, or compressed. The experiments of Vulpian and Bastien,<sup>1</sup> Tillaux,<sup>2</sup> Waller, and Mitchell, have shown that in the last four cases the alteration of structure is as decided as in the first. "A nerve trunk," observes Mitchell, "is made up of a multitude of tubes, the contents of which are so nearly fluid as probably to be capable of more or less movement to and fro. When to such a bundle we apply a tight ligature, no matter how soon it be relaxed, we annihilate at once all power of the nerve to transmit impressions past the injured zone. After gradual and equal pressure the nerve is for a time incapacitated, but soon regains its normal abilities. It seemed to me that the reason for such loss and such return must be a purely mechanical disturbance of the tubal contents and a like mechanical restoration of their needed conditions of activity." To test this hypothesis, Mitchell submitted the sciatic nerve of a rabbit to pressure of mercury standing in a tube at varying heights. The conducting power of the nerve persisted until it had been pressed upon by twenty inches of mercury, then disappeared, but began to return in about fifteen seconds after removal of the pressure.

It is paralysis by compression that most nearly resembles the

<sup>1</sup> Gaz. Méd., 1855.

<sup>2</sup> Quoted by Mitchell. Loc. cit., p. 92.

hypothetical "functional" paralysis, inasmuch as an organic lesion is imperceptible to the naked eye. Yet it is only the first stage of another, which can be demonstrated after slight contusion of nerves. When Mitchell struck a nerve smartly with a smooth broad whalebone slip, allowing a thin layer of muscle to intervene, the paralysis which ensued, although often temporary, was in degree complete. In these instances there was usually little hemorrhage, but a few fibres were torn, and a large proportion *suffered simply from mechanical disturbance, which gave them for a time a beccated look, and irregularities of outline, due to displacement of their semi-fluid contents.* If such a nerve be examined within a few days, when the paralysis has disappeared, the nerve tubes present but very slight traces of mechanical alteration, and a still later inspection rarely shows greater alteration of the nerve, save in a very few fibres.<sup>1</sup> Finally, even section of a nerve acts otherwise than by merely separating the nerve tubes from the nerve centres, for it is well known that the structure of the tubes begins to alter in a few days after such an operation, and that the myeline segments and finally disappears before the nerve atrophies. The morbid process therefore is identical with that in the other cases, and it may be therefore positively asserted that there is no abolition of the conducting power of a nerve, without disturbance of its myeline.

The rapidity with which a nerve recovers from paralysis caused by compression or contusion far exceeds the rapidity of recovery in infantile paralysis, except in such cases as those of Kennedy's, which are by no means the most common. If, therefore, a mechanical lesion exist when paralysis disappears in a few days, much more should it be present, if due to peripheric interruption of nerve function, when the paralysis has lasted for months or years. A "peripheric" paralysis is therefore just the reverse of an "essential" paralysis.

The effects of compression and contusion differ from the phenomena of infantile paralysis in that they are gradually induced, the paralysis is preceded by paresis, and by modifications of the sensibility, both absent in the disease under consideration. In infantile paralysis the loss of motility resembles that due to only one peripheric lesion, namely, section of the

<sup>1</sup> Loc. cit., p. 93.

nerve. This is especially true in the absolutely sudden cases. The abolition of faradaic contractility and the rapidity of muscular atrophy are also striking points of resemblance. It is evident, however, that the first effect of section is not upon the nerve in itself, but only upon the relations between it and its centre, and the structural alterations of the nerve that follow are not apparent until from four to six days later.<sup>1</sup> A sudden arrest in the generation of motor force at the centre would be manifested in precisely the same way as a sudden interruption in the line of conveyance of such force, and indeed in no other way; just as there is but one phenomenon to indicate the cessation of chemical action in a battery where electricity is evolved, and interruption of the current from section of the wire by which it is conducted, namely, absence of action. On the other hand, section of the nerve and section of the spinal cord at the point where it is given off, are followed by identical lesions of the nerve tubes, namely, loss of transparency, segmentation of myeline, irregular contour of tube wall, disappearance of tube contents, proliferation of inter-tubular connective tissue, ultimate atrophy. There is no evidence, therefore, that an alteration in the functions, *i.e.*, of the conducting power, of nerve fibres ever exists apart from some material alteration in their structure, and no suddenly produced material alteration can be even suspected in the type cases of infantile paralysis.

There remains, as the conceivable seat of the so-called "essential" paralysis, one of two alternatives—a functional alteration of the ultimate nervous fibrillae, at the point where they enter into intimate combination with muscular fibre, or a similar alteration at the other extremity of the nerve, where the axis-cylinders, from its spinal root, form the anterior nervous reticulum of the cord, and continue with the prolongations from the motor cells.<sup>2</sup> The possibility of a localized paralysis of the nerve-muscle element was first suggested by the now familiar phenomena of poisoning with woorara. The peripheric action of this drug was demonstrated by its effect upon nerves isolated from their centres, and its failure to paralyze others isolated from the vascular system through which the poison was circulating. A

<sup>1</sup> Mitchell, *loc. cit.*, p. 75. Lavuran, Thèse de Strasbourg, 1864 (quoted by Mitchell). Vulpian, *Arch. de Phys.* 1869.

<sup>2</sup> Boll. *Archiv für Psychiatrie*, 1873.

paralysis of this nature has, therefore, always been associated with a morbid alteration of the blood. To such alteration, and the demonstrable structural lesions of muscular fibre, may be probably attributed diphtheritic paralyses, and others observed during convalescence from various fevers, so well described by Gubler; and many cases of so-called infantile paralysis, developed in such connections, are undoubtedly of this kind. But no such blood-poisoning can be suspected in the type cases of infantile paralysis, nor in its absence can any alteration of the ultimate nerve fibrillæ be supposed. There remain, therefore, the spinal motor cells as the only possible seat of functional alteration, which indeed is more conceivable of elements whose functions are so delicate and complicated. Whether infantile paralysis be essential or not, it certainly must be central in its origin. It is the first, or negative class of autopsies, four in number, which seem to support the idea that the central alteration is functional. The only alternative is between an annihilation of function in the motor cells of the cord preceding or independent of any appreciable alteration of their structure, and a similar arrest of function, as a consequence of structural lesion. All truly negative autopsies, of which there are in reality only four, speak in favor of the first hypothesis. It remains to be seen how far or in what way the results of other autopsies speak in favor of the second, or how the two classes of facts can be reconciled.

The theory of spinal congestion has been based, first, upon the same clinical facts invoked in support of the "essential" theory; second, upon others—such as the frequent appearance of the paralysis in the morning, its original generalization followed by limitation, the absence of rachialgie or of peripheric pains, the gradual improvement, or even cure; third, finally, partly upon the purely negative autopsies, partly upon the one recorded by Fliess. It is noticeable that this latter was not in reality an example of congestion of the cord, but of the spinal meninges, and was accompanied by congestion of the cerebral meninges, justly ascribed to the accident that had caused the death. As regards the clinical history of spinal congestion, it differs from that of infantile paralysis—first, by the absence of important phenomena, characteristic of infantile paralysis, as the abolition of faradaic contractility and the rapid muscular atrophy;

second, by the presence of others not seen in the latter disease, as the invariably paraplegic form of the paralysis, the various modifications of the sensibility, as tingling, aching, burning, muscular fatigue; finally, by the frequency of paresis, which never precedes infantile paralysis, whatever the duration of constitutional symptoms. There are certain cases, however, whose history does remarkably correspond to that of spinal congestion. The case I have quoted from Dr. Jacobi is a type of this kind, and is distinguished by the coincidence of conditions indicating a congenital imperfection of blood-vessels, predisposing to hemorrhage; by the preservation of faradaic contractility, and by the cure of the paralysis under the influence of agents calculated to diminish the circulation of the spinal cord.

In ordinary cases of spinal congestion, the peculiar symptoms depend on the generalization of congestion to the entire thickness of the cord, including its sensitive regions; and the absence in infantile paralysis is explained, in the theory, by a hypothetical limitation of congestion to the motor regions. The possibility of such limitation of vascular turgescence is presupposed no less in the theory of hemorrhage than in that of congestion. It is necessary, therefore, as the basis of an examination of these two theories, to consider: 1st, the anatomical facts relating to the distribution of blood-vessels in the spinal cord; 2d, the pathological lesions that have been really discovered in cases of spinal congestion or extravasation; 3d, the clinical history of the symptoms that have been observed in connection with such lesions.

In the distribution of blood-vessels to the cord, the following circumstances are noteworthy:

The spinal arteries are derived from the vertebral, but reinforced all during their course by anastomoses with the ascending cervical, intercostal, lumbar, and lateral sacral arteries. There are two classes of veins—those which bring the blood from the cord and belong to the real medullary circulation, and those which are interposed between the dura mater and the walls of the bony canal, and which form the so-called vertebral sinuses or intra-rachidian plexuses. These differ from the cerebral sinuses by their frequent anastomoses, are but loosely supported by the dura mater, and surrounded by



a semi-fluid fat. The circulation in these extra-meningeal veins is in close dependence upon the double rhythm determined by the movements of circulation and respiration in the thorax, and liable to be affected, therefore, by lesions of the thoracic organs. These facts show a tolerably rich circulation both in the cord and its membranes; but the two last alone can be supposed to especially favor hemorrhage and that not into the cord, but in or outside of the membranes, and then not as a primitive accident, but as a consequence upon well-defined organic disease elsewhere. There are two anterior spinal arteries, and only one posterior; and the capillary network of the gray substance is richest in the anterior cornua. These are the two facts that might seem to render vascular turgescence or rupture more probable into the anterior than into the posterior segment of the cord.

Finally, the anastomoses formed between the spinal arteries and veins, and those which reinforce them, exist at the level of the spinal roots. In turgescence of the vascular system, therefore, pressure would be especially felt at this point, and might, if sufficiently intense, be supposed to interrupt nerve currents.

The force of the foregoing considerations is, however, much weakened by the following:

The arteries and veins furnished to the dura mater from the vessels contained in the vertebral canal, are separated from the cord by expansions of the vertebral ligaments. The cord is thus protected during turgescence of these vessels—at least of such as are of large size. The branches that enter the cord are of remarkably small size as compared with those of the brain, and subjected to much more numerous inflections. The pia mater into which they plunge, and by which they are sheathed, is much firmer than that of the brain. According to Retzius,<sup>1</sup> it consists of two layers, one lining the subarachnoid space, one closely applied to the cord. The subarachnoid space is large, and occupied by septa of connective tissue, among which circulates freely the cerebro-spinal fluid, constantly tending to restore equilibrium of pressure upon the cord. The anastomoses around the nerve roots are so free and extensive that an afflux of blood towards the cord from without, that

<sup>1</sup> Schultze's Archiv, 1873.

should remain limited to one or two pair of roots, is almost inconceivable. Similarly, the anterior capillary networks of the axis communicate freely at the periphery with posterior network, and with those above and below them; so that the gray substance of the cord, instead of being divided into distinct vascular territories, as is the case with the brain, contains a sort of uninterrupted vascular column, at any one point of which the blood is with difficulty obstructed. Finally, the danger of interference from action of the heart, is diminished by the nearness of the heart to the cord; and the influence of respiration is lessened from the fact, that while the meningeal veins empty into the superior vena cava during inspiration, they are free to empty into the inferior cava during expiration, so that a double provision is made against their obstruction. This is in contrast with the provision for the brain, and in accordance with the greater immediate danger to life from extensive congestion of the spinal cord.

It follows, therefore, that the normal anatomy of the cord tends to render medullary hemorrhage extremely difficult, for every provision is made against such local obstructions to the circulation as, by increasing local vascular tension, are known to be the efficient cause of hemorrhage into the brain. Nor has yet been demonstrated in the spinal arteries, the lesions, atheroma, embolism, thrombosis, which are so common in the cerebral. Liouville alone, in a single case, has believed to have discovered miliary aneurisms.<sup>1</sup> But none of these lesions exist in children, or would be suspected in cases of infantile paralysis.

A general venous congestion of the cord is from the anatomy conceivable, and from clinical facts demonstrable; but such localization of the congestion as would be required to explain the phenomena of infantile paralysis, is as incompatible with the free vascular communications just described, as are the symptoms of spinal congestion and those of the latter disease. It is true that four of the autopsies besides that of Fliess, describe a dilatation of blood-vessels limited to the anterior cornua of the cord, but this was associated with alterations in the nutrition of anterior cells. Local variations in cellular activity

<sup>1</sup> Quoted by Hayem, *Thèse sur les Hémorrhagies Intra-rachidiennes*, 1871. From this thesis much of the foregoing has been taken.

do, indeed, determine local variations in the circulation; indeed the phenomena of capillary circulation are well known to depend mainly upon the action of cells. In such cases, it is the alteration of the cells which is the efficient cause of the disease, the congestion is consecutive, subordinate, and as an explanation of the paralysis, already necessitated by the cellular affection, may be set entirely aside.

These considerations are still further sustained by analysis of the histories of spinal hemorrhage,—reputed a primitive accident. Hayem has analyzed 100 cases of hemorrhage into the cord or its membranes, and affirms that this is the entire number hitherto recorded in science. Of the cases of meningeal hemorrhage all but five were evidently consecutive to some other lesion, as, rupture of a neighboring vessel, especially with an aneurism,<sup>1</sup> extension of a cerebral hemorrhage, traumatism, certain diseases of the nervous system, as tetanus, epilepsy, chorea, inflammations;<sup>2</sup> finally, to certain abdominal diseases, to fevers, alterations of the blood, or poisoning, especially with strychnine.

Of the five cases of meningeal hemorrhage that seemed the most purely primitive, in the first (Obs. Binard<sup>3</sup>) the vessels ruptured under the influence of a violent effort; in the second<sup>4</sup> and third<sup>5</sup> (Ollivier and Fallot) an encephalo-rachidian congestion preceded the hemorrhage; finally, in two cases, Guinac<sup>6</sup> and Bigot,<sup>7</sup> the hemorrhage occurred amidst symptoms of long-standing, indicating a spinal pachymeningitis.

The cases of asserted hemorrhage into the spinal cord are still more ambiguous.

Two facts are common to all: 1st, the clinical symptoms of hemorrhage are preceded by a traumatism, or by symptoms of

<sup>1</sup> Laennec, *Traité d'Auscult.*, t. iii., 4<sup>e</sup> edit. p. 443.

<sup>2</sup> Bouchut, *Gaz. des Hôp.*, 1863.

Joffroy, *Soc. de Biol.*, 1870.

Thure, *Arch. Gen.*, 1845.

Bellingieri, *Gaz. Méd.*, 1834.

Griesinger, *Arch. der Heilkunde*, 1862.

Fuller, *Lancet*, 1862.

Calmeil, *Traité des Maladies de l'encéphale*, 1859, t. i., p. 167.

Ollivier d'Angers, t. ii., p. 350.

Bruggenmann, *Schmidt's Jahrb.*, 1836. And others.

<sup>3</sup> Quoted by Hayem.

<sup>4</sup> *Loc. cit.*

<sup>5</sup> *Archives Gen.*, 1830.

<sup>6</sup> *Path. Int.*, t. vi., p. 721.

<sup>7</sup> *Thèse de Paris*. 1847.

a myelitis; 2d, at the autopsy the hemorrhagic clot is found imbedded in tissue softened to a much greater extent than could be explained by its pressure, or presenting at least microscopical evidence of a central diffused myelitis.

As an illustration of the usual history of such cases, I will relate the details of one, of which I was recently enabled to witness the post-mortem examination. The patient, a man of 28 years old, after exposure in a snow-storm, was attacked by a severe pain in the lower part of the back, that, after lasting two or three days, was followed by paralysis of the left leg. This, however, gradually disappeared, so that three months later, the patient considered himself well, when one day, upon entering an omnibus, he suddenly lost all power over his lower limbs and fell to the ground. He was carried home, and although incapable of standing or walking, was able to move the legs a little when lying in bed. The paralysis extended to the sphincters, and was accompanied by complete anæsthesia of the lower extremities. In an hour or two the pain in the back returned, and became so extremely severe that, about the second day after the fall, morphine injections were used; a few hours later the pain disappeared, but the motor paralysis was so much increased that the patient could not stir in bed. In the course of three or four months motor power was sufficiently regained to allow the patient to creep about a little on crutches; but he remained generally in bed, and eschars of the sacrum and of the ischial tuberosities developed in July, about six months after the fall. He sank gradually, and died in October of pulmonary cedema, without the occurrence of any sudden accidents. At the autopsy was found, in the upper part of the lumbar cord, a hemorrhagic clot that filled a cavity about an inch long, and occupying the entire thickness of the cord. Around it for a quarter of an inch the cord was softened and altered in color.

At the earliest this hemorrhage could not have taken place before January, and then would have been preceded for three months by symptoms of myelitis. A case related by Lancereaux in the Soc. de Biologie for 1861, shows that hemorrhage may occur in the course of a myelitis without adding any new symptoms to those already existing.

In thirty cases of hematomyelic analyzed by Hayem, the symptoms were analogous to those of myelitis, and in all at the

autopsy the clot was found surrounded by softening too extensive to be the mere effect of the hemorrhage. In the famous case described by Cruveilhier, although there was a circumscribed hemorrhage and a clot that extended from the level of the fourth to that of the sixth cervical vertebra, blood was also diffused throughout the entire gray substance of the cord—a lesion which almost necessarily indicates a central myelitis.<sup>1</sup> So in one case related by Brown-Séquard<sup>2</sup> small clots were found in the centre of the cord, between the origin of the second and third dorsal nerves, and the cord itself was softened and infiltrated from the third cervical to the last dorsal pair. Brown-Séquard quotes two other cases, in neither of which the hemorrhage was circumscribed. In a case by Jaccoud, the hemorrhage had occurred in the lumbar region, but coincided with an enormous cerebral hemorrhage. In a case communicated by Liouville to the Soc. de Biol. (1872), two attacks of paraplegia occurred suddenly at three years' interval, and death two months after the second attack. Several distinct hemorrhagic foci were found in the lumbar cord, and the small blood-vessels in the neighborhood presented varicosities that Liouville considered analogous to the miliary aneurisms he had previously described in the arterioles of the brain. In another case, quoted by Hayem from Massot, a sudden paralysis of both arms had been followed by very rapid atrophy of their muscles, and also of those of the neck, thorax, and, to a less extent, of the lower limbs. Faradaic contractility was entirely lost. Death occurred suddenly, and at the autopsy a small hemorrhagic clot was found in the central gray substance and posterior horns of the inferior cervical cord. But a reddish color extended over the greater part of this gray substance, although the blood itself was not infiltrated. It is to the alteration indicated by this color, that must be attributed the previous paralysis and muscular atrophy, while the hemorrhage, which must have immediately preceded the death, was secondary to this.

It sometimes happens that the symptoms of an acute myelitis, uncomplicated with hemorrhage, exactly resemble the accidents usually attributed to hemorrhage itself. This is well shown by a case of Koster's, recorded in *Cunstatt's Jahrbuch* for 1870.

<sup>1</sup> Anat. Path., iii\*, Livraison.

<sup>2</sup> Lectures on Central Nervous System, p. 87.

A man, hitherto healthy, found himself one morning, on awakening from sleep, to be completely paralyzed and anaesthetic in the lower extremities. No previous symptoms had occurred, except a little tingling in these same limbs during a few days. There was no pain, but soon dyspnoea, and then an eschar developed, which caused death by septicemia in two months. At the autopsy the lumbar cord was found softened and atrophied, as were also the anterior roots, but there was no trace of hemorrhage. Other similar cases might be quoted. Since, therefore, the symptoms ascribed to hemorrhage may be identical with those due to myelitis,—since in cases where hemorrhage has really occurred, it has been preceded by symptoms of myelitis.—since, finally, at the autopsy, the hemorrhagic clot is found embedded in tissues softened and altered in a way to present all the characters of myelitis,—we are justified, we think, in admitting with Hayem, Dujardin Beaumetz, Charcot, Hallopeau, and Koster, that a primitive hematomyelie is among the rarest of pathological accidents, and that hemorrhage hardly ever occurs into the spinal cord, unless its tissues have been previously altered by inflammation. This corroborates the inferences already drawn from the normal anatomy of the cord, that hardly any condition of hemorrhage can be found to exist in the distribution of the blood-vessels themselves. There is, therefore, the strongest presumptive evidence against the idea, that such a rare accident is the cause of so common a disease as infantile paralysis. Nor do the symptoms of such accident, when occurring, in the least degree resemble those of this disease. They are hyperaesthesia or anaesthesia, as sudden and complete as the motor paralysis,—exaggerated reflex actions, tetanic contractions, where the hemorrhage is meningeal—rachi-algia and peripheric pains, paralysis of the sphincters, production of eschars, march rapidly progressive, and towards a speedily fatal termination. It is true that, as in the theory of congestion, these symptoms would depend upon the extension of the lesion to other than the anterior regions of the spinal cord; and the theory of hemorrhage in infantile paralysis supposes, as in the case of congestion, a localization of the morbid process to the anterior cornua or columns. But for the same reasons as in this first case, such localization is only conceivable as a capillary phenomenon dependent on the morbid nutrition of cells,

to which, therefore, it would be quite secondary. Still less do any autopsies exist to prove its possibility. Three only have been even quoted in connection with infantile paralysis. Of these, the first, Clifford Albutt's, was followed by the death of the child within a few hours, and the hemorrhage extended rather into the posterior than anterior horns. It was never even supposed to be a case of infantile paralysis, but is related by Albutt as an example of the way in which such disease might be produced, had the hemorrhage taken place into the lambar instead of cervical cord, where it so soon proved fatal. In the second case, Hayem's, paralysis had indeed occurred at two years, and the autopsy was made long after; but then the blood was found to have been infiltrated through the gray substance, as in cases of central, though here localized, myelitis. Finally, in Hammond's case a clot is said to have been found in the anterior column, but the examination of the cord was insufficient to decide on the coexistence of inflammatory lesions.

Among all the questions relating to infantile paralysis, the theory of spinal hemorrhage is the one that would seem to be most susceptible of elucidation by experiment. Vulpian,<sup>1</sup> in 1861, injected lycopodium powder into the anterior cranial arteries of a dog, and, in several cases, found the vertebral and spinal arteries obliterated, and real softening with hemorrhage produced in the corresponding portion of the cord. These experiments should be repeated; they show how hemorrhage might be produced, but as they connect it with an increase of local arterial tension caused by circumstances that are not imitated pathologically, they do not really throw much light on the question which immediately occupies us. From review of the preceding considerations, therefore, we must exclude the hypothesis of congestion or hemorrhage from the pathogeny of the great majority of cases of infantile paralysis. But in the cases of which we have made a class apart, as characterized by the presence of peculiar symptoms these very lesions may very probably exist.

These exceptional symptoms were, complete though temporary anæsthesia, hyperæsthesia, retention of urine, and, in one case, opisthotonos, all indicative of more extensive affection of the central axis of the cord than can be possible in cases of

purely motor paralysis. They are, in fact, the symptoms of acute but circumscribed myelitis, involving the whole axis of the cord, and possibly, therefore, complicated with minute hemorrhages. All the cases of spinal paralysis occurring in the adult, even when resembling infantile paralysis in every other particular, have differed by the presence of more or less pain; also a proof of the wider though temporary generalization of the morbid process.

The variations in the amount of constitutional disturbance, at the period of invasion, imply further variations in the extension of the morbid process, even when limited to the motor elements of the cord. The autopsy made by Prevost, as also those by Roger and Damaschino, shows that altered cells and blood-vessels may be found scattered through a great extent of the gray substance of the cord, amidst elements perfectly healthy, and far removed from the foci of paralysis. These alterations indicate an original generalization of the affection, from which the majority of the elements subsequently recovered, with consequent limitation of the paralysis. Constitutional disturbance was in proportion to the number of elements affected at the moment of invasion, not to those remaining permanently injured. From the fact observed by Duchenne fils, that fever was less in proportion as the child was younger, it should be inferred that, at an early age, morbid communications between the cells of nerve centres are less facile than at a later period, when they have become habituated to coördinated physiological action. Communications between cells must depend on different conditions than those which regulate communications between nerve cells and nerve fibres. The originally peripheric development of the nervous system, and the incomplete elaboration of the cellular masses of the nerve centres at birth, would explain why the former mode of transmission should be so ready, the latter so much less frequent; explain the tendency, on the one hand, to reflex irritations, and on the other, to minute localization in the spinal paralysis of children.

It has been demonstrated by Gerlach, and quite recently by Boll, that the prolongations of motor cells may be traced into direct communication with the axis cylinders of the nervous reticulum from which spring the anterior roots, while between



the posterior cells and roots the communication is only intermediate. This fact may explain why, for a long time, morbid processes are communicated to nerves from the anterior more readily than from the posterior nerve cells; or, in other words, why in the child paralysis is more readily produced than pain.

We speak thus confidently of motor cells, because by exclusion we have been already left to localize in them the morbid process, functional or organic, that is the immediate cause of infantile paralysis. The considerations in regard to congestion and hemorrhage should have served to show that the morbid process was at least not dependent upon them, or consecutive to any vascular lesion. It only remains, by reference to those autopsies which have revealed some lesion of nervous elements in the cord, to ascertain, if possible, which among them may be considered primitive, and if it be the motor cells, to what known lesion or functional alteration the loss of their properties may be due.

Four different cases exist, alike in but one point—the coincidence of muscular atrophy. In the first, the motor nerves alone (cases of Elischer) or of the nerves and a corresponding portion of the spinal cord also, were simply atrophied (cases of Hatin and Louget). In the second, the anterior columns and roots were sclerosed, without other lesion (cases of Laborde), or together with atrophy of the nerve (case of Cornil). In the third, the motor cells are pigmented, as in Gombault's case of adult paralysis, or atrophy, and disappear. Such atrophy, with sclerosis of the cornua without sclerosis of the columns, was present in six autopsies. Finally, in the fourth case, complex lesions are present, atrophy of the cells, dilatation of blood-vessels, fatty degeneration of their walls, fasciculated sclerosis, atrophy of nerves. Of these lesions, the atrophy of muscular fibre may be caused by any irritation of its motor nerve. When Erb crushed the nerve of a frog by a ligature, the nuclei of the muscular sarcolemmæ began to multiply in two weeks, and the fibre to waste while retaining its striations, its place being supplied by hyperplasia of connective tissue. And muscular atrophy is known to be a common consequence of traumatic lesions of nerves.

But in infantile paralysis the nerve has suffered no traumatism, yet, when examined, was usually found to have itself

atrophied. Such atrophy can only result from a successive series of structural alterations, similar to those which invariably follow upon section of a nerve. It has been shown that the phenomena resulting from section of a nerve, especially the rapid abolition of faradaic contractility, can only be imitated by an abolition of the properties of the motor cells at its central end, and that when in these circumstances no condition existed capable of interrupting the conducting power of the nerve, it must be presumed that motor force had ceased to be generated. The nerve atrophy must therefore depend upon some affection of the motor cells, that must have persisted long enough to produce it; and the rapid muscular atrophy indicates that the nerve, either before wasting or during the process of wasting, had been irritated. As no cause for such irritation exists in the track of the nerve, it must be looked for in the motor cells; and hence these, either before or during the process that resulted in their abolition of function, must have been the seat of a peculiar irritation.

But irritated cells are in a condition of exaggerated nutritive activity, that determines to them a local afflux of blood, and we have already seen that in the spinal cord no other cause for such minutely localized congestions could be assigned, except excited cellular activity. To this, therefore, must be attributed the dilatations and varicosities of the blood-vessels. The fat granules in their lymphatic sheaths result from metamorphosis of nutritive material, no longer needed by atrophied cells. Finally, while atrophy of nerve roots is associated with atrophy of nerves, and may be considered as an effect of this, or as a coincident lesion, due to the same cause; atrophy and fasciculated sclerosis of the columns of the cord, are invariably associated with irritative processes in the cells of the corresponding cornua, posterior sclerosis in *tubes dorsualis*, anterior sclerosis in myelitis, in such cases of wasting palsy as are associated with central lesion, and in many of the cases of infantile paralysis where lesions of the anterior cells were demonstrable. It is to be inferred, therefore, that it depended on similar cellular irritation even in the cases where lesions of cells were no longer demonstrable at the autopsy, as in the three where antero-lateral sclerosis was the only lesion found.

The various alterations of tissue must, therefore, each be

ascribed to an irritation of the anterior or motor cells of the cord, and by this reference to a unique morbid process these varieties are easily reconciled. The differences are explained by an arrest in the morbid process at different stages of its evolution. At any stage such alterations of special elements might be produced as would permanently oppose restoration of function, even though the cells failed to degenerate. Thus, if during their period of irritation sufficient irritation had been propagated to a motor nerve to initiate morbid processes resulting in its atrophy, or in that of the muscular fibre, return of motion would be impossible, even though the cells, original source of the disorder, regained their functions. In the same way, a sclerosis that began to develop in the antero-lateral column while there were no motor impulses to be transmitted, would oppose a permanent barrier to their transmission when the generation of motor forces recommenced.

Finally, in regard to autopsies so completely negative that even the nerves and muscles were found intact, we may say that none such are recorded, for in all four cases the muscle had atrophied, in two the alteration of nerve was also extremely marked; in the remaining two there is no mention of the nerve. Indeed, at present, the motor nerves are less frequently examined than the cord, or at least with less care, so that lesions are more often overlooked.

The lesions discovered in the motor cells, therefore, indicate the nature of the morbid process as decidedly in the cases where they are absent, as in those where they are found. Cellular atrophy is a proof that the molecular nutrition of the cells has been arrested. It is evident, however, that the abolition of function, so nearly sudden, must coincide with the first disturbance of nutrition, and not only with its ultimate consequence, cell atrophy, which must be accomplished gradually. While it is as conceivable that the chemical metamorphoses in the cell may be instantly arrested by means of an impression conveyed to it by a nerve, as that the chemical processes going on in a solution of inorganic salts should be arrested by the passage of a current of electricity. Both cases illustrate the now familiar law of the correlation of forces, of the relations between chemical affinities and electrical or neural actions.

The alterations of motor cells in infantile paralysis serve,

therefore, as a point of transition between so-called functional disorders and so-called organic diseases, and show with exquisite precision the manner in which alterations of tissue may be determined by perversions in the nutrition of cells.

Cases other than those of infantile paralysis are not altogether rare, where the annihilation of function in important nerve cells has been so complete, that death has occurred in a few days, and before atrophic lesions had had time to develop. Tetanus has long been a familiar example, and here, as in infantile paralysis, more accurate microscopical researches are beginning to discover lesions of the cord, when life has been sufficiently prolonged. Certain curious cases of acute ascending paralysis fall under the same category. In the one related by Pellegrino Lewins in the *Archives Générales* for 1865, the death is probably due to annihilation of the functions of the brain. But another quoted in the thesis of Petit fils, where the autopsy was made by Cornil and Ranvier, is more conclusive. In the midst of apparent health occurred a sudden paraplegia, accompanied by fall of temperature and analgesia in the affected limbs, pain in the lumbar region of the back, abolition of reflex movements. Anaesthesia without paralysis extended to the upper extremities, and death supervened on the fifth day in cyanosis, from failure of the motor forces of respiration. The most careful examination of the brain and spinal cord could discover no lesion, even microscopic.

In regard to the manner in which the nutrition of the anterior cells may be arrested, it is well known that two theories are in presence. According to one, a peripheric irritation causes a spasmodic "reflex" contraction of the blood-vessels of the spinal cord. According to the other, this irritation is directly propagated, by means of an afferent nerve, to a cell whose nutritive metamorphoses are arrested, as might be the chemical reactions in a retort by the passage of an electric current. The clearest expression of this theory has perhaps been given by Mitchell, in the paper contributed to this polemic by him,<sup>1</sup> and reindorsed in his recent book, *On Injuries to Nerves*. "It appears to him possible that an injury may be competent so to exhaust the irritability of the nerve centres, as to occasion more or less permanent loss of function. A strong electric current is cer-

<sup>1</sup> New York Medical Journal, 1866. See also Jaccoud, *Paraplégie et l'Ataxie*.

tainly able to cause such a result in a nerve trunk ; and reflecting on the close correlation of the electrical and neural force, it does not seem improbable that a violent excitement of a nerve trunk, however brought about, should be able to completely exhaust the power of its connected nerve centre. . . . There is no reason why, if shock be competent to destroy vitality in vaso-motor nerves or centres it should be incompetent to so affect the centres of motion or sensation." Handfield Jones<sup>1</sup> declares as the result of many clinical observations, "that any afferent nerve may act as an inhibitory nerve upon the centre or centres with which it is connected, disordering or paralyzing its action." In the first number of his *Archives*, Brown-Séquard has detailed many illustrations of such inhibitory actions, affected by the most diverse sensitive nerves on the most different central ganglia. Eulenburg quotes the experiment of Lewisson,<sup>2</sup> who by strong irritation of the cutaneous nerves of a frog, suspended motor power, not only in the irritated limb, but in the others, and considers it a proof that the centripetal irritation of sensitive nerve is sufficient to arrest the functions of the nerve centres. The anatomical facts of infantile paralysis show finally that the function of such centres is arrested by interference with the chemical processes in the nutrition of the nerve cells.

The immense pathological importance of the study of infantile paralysis may be best appreciated by enumerating its different pathological relations, which the foregoing pages have tried to set in relief.

1st. It links together the most conspicuous external deformities, involving entire limbs, with lesions of internal microscopic groups of cells, so minute as, until recently, to have escaped observation.

2d. By exquisite localization of pathological lesions it confirms the doctrine of localization of function and independence of morbid processes in special groups of nerve cells.

3d. It helps to establish a group of diseases bearing various relations of cause or effect to this same group of cells—the anterior spinal—as adult spinal paralysis, progressive muscular atrophy ; finally, even bulbar paralysis, where the

<sup>1</sup> *Functional Nervous Disorders*, pp. 9 and 16, 1870.

Lehr buch, p. 428, quotes *Archiv. Reichert and Du Bois-Reymond*, 1869.

disease is confined to the groups of motor cells in the medulla.

4th. With these others it helps to show the immense and peculiar influence exercised upon the nutrition of muscles by the nerve cells influencing their motor nerves. This influence is in both resemblance and contrast with that exercised on the nutrition of the skin and subcutaneous tissues by the groups of cells connected with the posterior roots and sensitive nerves. Lesions of these produce eschars, as of those, atrophy, sclerosis, or fatty degeneration.

5th. As a localized myelitis, certain cases, at least, of infantile paralysis are to be considered in their relations to other forms of myelitis, localized or diffused, parenchymatous or interstitial. They are to be contrasted with cases of tabes dorsalis, in which the myelitis localized in the posterior cornua determines a fasciculated sclerosis of the posterior columns, relatively more frequent and important than the anterior sclerosis, contrasted also with the anterior lesion of wasting palsy, which, from the slow march of the disease, may often depend on an extension of irritation from the periphery; contrasted with acute diffused central myelitis, with equally rapid march, but where the lesion involves both neuroglia and nervous elements.

6th. As originally confined to the latter, the lesions of infantile paralysis offer one of the best illustrations of the "parenchymatous inflammation," long ago described by Virchow.

7th. By its sudden invasion infantile paralysis is symptomatically allied to such accidents of the vascular system as congestion or hemorrhage. But as these are shown to be either absent or rare, or consecutive to an affection of nerve cells, the capacity for independent morbid action possessed by these latter receives another confirmation.

8th. These affections serve as a link between the so-called reflex or inhibitory paralysis and those dependent on marked lesions of the cord.

9th. Finally, they trace minutely the successive steps in a morbid process that, beginning in a functional alteration of cellular nutrition, terminates in organic destruction of tissue, and thus dissect apart the complex phenomena both of inflammation and of general cell life.

## APPENDIX.

To the cases described in the preceeding pages, I am enabled to add another, observed since the reading of the paper.

On the 18th of February a paralyzed child died at Dr. Knight's hospital, whose history was as follows. When a year old, the boy had had an attack of dysentery, and on recovery was found to be paralyzed in all the four limbs, and even in the muscles of the neck and back. These regained their power first, so that after a few weeks, the child was able to sit; then recovered the use of his arms, but the paralysis persisted in the lower extremities, being most marked on the left side below the knee. Admission to the hospital eight years later with paraplegia and atrophy of the paralyzed limbs. There was then not the slightest reaction to galvanic or faradaic electricity on the left side, but some response to the induced current was obtained on the right. The general health of the patient was excellent, and remained so to the day of his death. On the morning of that day he arose at 5½, still apparently well; at 6½ vomited, and was found sitting down in a corner of the ward, complaining of feeling ill. While the attendant was questioning him, he suddenly turned pale, *fell forward* on the floor, became almost instantly pulseless, and in five minutes was dead.

The autopsy was made by Dr. Janeway in the presence of Drs. Knight, Gibney, Milner and myself. The paralyzed limbs, spinal cord, and brain were all examined with care. The *muscles* of the left leg were almost entirely converted into fat. The right gastrocnemius was equally fatty, but the deep muscular layer was tolerably preserved. To this fact was due the degree of electrical reaction that had been observed during life, as also a certain amount of voluntary control of the limb.

The cervical region of the *cord* was somewhat injected, and a little blood was infiltrated between the dura mater and the arachnoid. This came from the cranium. In this same region, careful inspection showed that the antero-lateral column was somewhat diminished in size on the right side. In the lumbar region, on the contrary, the atrophy existed on the *left* side, and by the aid of a magnifying glass was seen to extend to the left horn of gray matter.

It has not yet been possible to make the microscopical examination, but its results will be published as soon as obtained.

The cause of death was found in the *brain*. A hemorrhage had taken place into the left posterior lobe of the cerebellum. About an ounce of blood was contained in a cavity the size of a walnut. Blood had fused along the base of the brain to the anterior fossæ, and also, as before observed, had descended into the spinal membranes. The entire brain, and especially the left half of the cerebellum, was much injected.

The first symptoms presented by the child evidently coincided with the commencement of the hemorrhage, and when the effused blood became sufficient in quantity to press upon the medulla (with which, at the autopsy, the outer edge of the clot was found almost in contact), death occurred, with the *choc en avant*, so characteristic of sudden lesions of the medulla or cervical cord. Examination (by Dr. Janeway) of the blood-vessels of the cerebellum, found them extremely fatty.

Fatty degeneration of the encephalic blood-vessels, and hemorrhage into the cerebellum, are lesions so rare in a child of nine years old, as already to render this autopsy of especial interest. But more important for our present purpose, is the examination of the cord in a case of paralysis dating from infancy, and that, even before the microscopical examination, can already be said to show the lesions now to be considered as characteristic, namely, atrophy of the antero-lateral columns, and of the anterior cornua. Nevertheless, we doubt that this case can be claimed as a type of Infantile Paralysis. A general paralysis after a febrile disease, as dysentery, may, with at least as much probability, be attributed to primitive degenerations of the muscles, to which the atrophy of the motor elements of the cord was only secondary.



SARCOMA OF THE UTERUS.<sup>1</sup>

BY T. GAILLARD THOMAS, M.D.

(Read before the New York Obstetrical Society, March 17, 1874.)

SCATTERED through medical literature may be found descriptions of a tumor growing from the cavity of the uterus, which appears to occupy a middle ground between myofibroma on the one hand, and true cancer on the other.

Presenting in many respects the ordinary physical aspects of benign fibroid growths in their early periods, these tumors demonstrate a marked tendency to return after ablation. Even after repeated and thorough removal, they again and again recur, and in many cases their real character is in this way discovered. Another peculiar and dangerous characteristic, which marks their difference from benign fibroids, consists in their tendency to throw out fungoid growths, which show a marked tendency to undergo molecular death and disappear by ulceration, which process saps the vital forces of the patient by repeated and prolonged hemorrhages, and by opening the mouths of absorbent vessels for the entrance of septic elements into the blood.

The clinical features of such growths will be found recorded in English literature by Callender,<sup>2</sup> Hutchinson,<sup>3</sup> Oldham,<sup>4</sup> and West,<sup>5</sup> to whose interesting accounts the reader is referred.

*Nomenclature.*—Pathologists were struck by these two facts in connection with such tumors; first, their marked tendency to return, and second, the absence of micrographic evidences of cancer in pathological developments, showing many of the features

<sup>1</sup> Just after the preparation of this paper, one upon the same topic appeared in the American reprint of the London Obstetrical Journal, by Dr. W. F. Jenks. The literature of this subject is so scanty, that we necessarily drew upon the same sources, and the two papers are very similar. The excellent essay of Dr. Jenks really renders this superfluous, and it should not have appeared so soon after his but that I was under promise to read it before a society, and could not spare time to replace it. Having read it, it passed out of my possession.—T. G. T.

<sup>2</sup> Path. Transacts., vol. ix.

<sup>3</sup> Ibid., vol. viii.

<sup>4</sup> Wilks, Path. Anat., p. 404.

<sup>5</sup> Dis. Women, art. "Recurrent Fibroid."

of malignancy. Paget grouped them under three heads—malignant fibrous tumors, recurrent fibroids, and myeloid tumors; while Lebert described them under the name of fibroplastic tumors, and Rokitansky under that of fasciculated cancer.

Not until the time of Virchow were they described under the old and previously loosely applied term of sarcoma. This pathologist clearly defined the disease and placed it in a distinct class apart from developments somewhat similar in clinical features, but some of which were entirely benign and others truly cancerous.

*Definition.*—"Sarcoma,"<sup>1</sup> says Virchow, "is for me a production easily definable. I mean by it a growth, the tissue of which, following the general group, belongs to the connective-tissue series, and which is distinguishable from marked varieties of the groups of connective tissues only by the predominant development of cellular elements." They possess, he declares, the characters of incomplete rudimental or embryonic development, and not those of perfect tissue. This peculiarity existing in the original tumor, becomes more and more marked as recurrence takes place after successive removals.

*Frequency.*—Were I to draw my deductions from my own experience, I should say that sarcoma of the uterus was not very rare. Many cases which have been regarded as cancer, and not a few of supposed fatal fibroid tumor or polypus, have been unquestionably instances of this affection. Virchow,<sup>2</sup> however, expresses a different opinion. "The production of sarcoma on the mucous lining of the uterus," says he, "is often spoken of, and even in his first work Lebert describes a fibroplastic polypus. Nevertheless, from my observation, sarcoma is very rare at this point, and the majority of tumors described as such are of a simple hyperplastic nature. True sarcoma, however, does originate in the uterine mucous membrane in medullary form, difficult of recognition, often very soft, and with round cells, sometimes with all the characteristics of myxosarcoma; however, the tissue may become in places more compact, and may form larger masses, and attain a degree of firmness so

<sup>1</sup> Pathol. des tumeurs, par R. Virchow, traduit par P. Aronsohn, vol. ii. page 173.

<sup>2</sup> Op. cit., vol. ii. p. 344.

great that I have seen the best diagnosticians deceived as to the nature of the affection, and take it for a fibroid." Before my attention was especially called to this subject, within the past three years, I confounded such cases with medullary cancer. Since that time I have met with four cases, which, both from clinical and microscopical evidence, I am forced to regard as sarcomatous developments. None were confounded with simple hyperplastic growths, as Virchow suggests, for all ended fatally.

*Pathology.*—Pathologists have commonly confounded sarcoma of the uterus with cancer. The reasons for this are probably these; after the former begins to ulcerate it resembles the latter in many clinical features; both have a marked tendency to return, and they sometimes unite in the same tumor. The time has now certainly arrived when they should be separated both clinically and pathologically.

Of late years, uterine sarcoma as a disease apart from cancer has received careful clinical study in Germany, excellent reports of cases having been furnished by Ahlfeld, Hegar, Winckel, Gusserow, and others.

Unlike myofibromata, sarcomatous tumors have no distinct capsules, but are immediately connected with the uterine connective tissue. Virchow declares that "in accordance with their density, sarcomata may be, like all morbid tissues, divided into two groups—soft and hard sarcomata." As the disease consists merely in a multiplication of cells, homologous to the tissue in which it grows, and subject to no other disorder than hypertrophy, it is characterized by one of the cells typical of the connective-tissue group. Thus we may have spindle, round, and stellate celled sarcoma, the second being the most frequent, and the first the rarest in the uterus. In some cases the cells are so large as to cause the name "giant-celled" to be given to the growth. "We may," says Virchow, "divide all sarcomata, and not simply those rich in cells, into two groups: the one with large, and the other with small cells." These cells are merely exaggerated reproductions of those of the mother tissue, and "behave like cells of parenchyma, not like surface cells (epithelium, cancer)." Between these cells the intercellular substance is always preserved, while in cancer we find cells of epithelial

type pressed closely together in alveoli formed of trabeculæ created by connective tissue.

Sarcoma, usually primary, is sometimes engrafted upon myofibroma by the process styled metaplasia, and a true sarcomatous tumor may itself be affected by cancer. Sarcomata into which a great deal of fibrous tissue enters are dense, like myofibroma, and Hegar<sup>1</sup> admits a transition form, a fibro- and myo-sarcoma.

These growths are so rich in vessels, both as to number and size, that Virchow declares that this fact allows of a distinction being easily made between them. To this vascularity is due their tendency to give forth a watery flow, to bleed freely, and to absorb septic materials.

*Causes.*—With reference to this subject little can with positiveness be said. Virchow alludes, in speaking of sarcoma in general, to injuries, youth and old age, primitive debility in the part affected, inflammation, etc.; but whether uterine sarcoma has ever been traced to these, I do not know.

*Symptoms.*—These may be summed up as menorrhagia and metrorrhagia; offensive mucous discharge; pinkish watery discharge; discharge of shreds or portions of the tumor; pressure on rectum and bladder; expulsive uterine pains; constitutional depreciation.

Gusserow declares that pain is constant and early, but Hegar denies this. My experience would lead me to endorse the opinion of the latter.

*Physical Signs.*—These will depend to a certain degree upon the peculiarities and stage of the growth. Sarcoma invariably develops in the cavity of the uterus. The growth usually arises from the uterine wall by a broad base, and projects into the cavity. In time uterine contractions dilate the cervix, and a portion of the mass is forced into the vagina.

In rare cases sarcoma assumes a polypoid form, and in others, coincidently with the uterine development, an extra-uterine growth projects into Douglas's pouch or into one iliac fossa.

Another way in which sarcoma affects the uterus is by diffuse infiltration into one or both walls. This may affect mucous and

<sup>1</sup> Archiv für Gynäk., II. 1871.

submucous tissues alone, or even the muscular structure itself. This surface soon ulcerates, and gives forth a fetid discharge. In some cases this diffuse infiltration may affect the whole uterus, giving it the appearance of symmetrical enlargement.

If the tumor can be touched it is usually found to be soft, spongy, and friable, though in some cases it is hard and firm like myofibroma. By conjoined manipulation the uterus is found to be large and usually irregular in shape, as if the seat of fibroid tumors. The uterine sound indicates enlargement of the organ. It is very common for the cervix to be dilated and portions of the mass to be expelled.

*Differentiation.*—Although these symptoms and physical signs will strongly point to the existence of sarcoma, the microscope alone will distinguish it from cancer, myofibroma, and simple hyperplastic growths.

*Course, Duration, and Termination.*—It runs a much slower course than true cancer; a much more serious one than fibroids and hyperplastic growths. In rare cases it terminates rapidly, but it has frequently been known to last five or six years. The patient gradually sinks under the following morbid influences: hemorrhage, septicæmia, spread of the disease to neighboring abdominal viscera, disturbance of nutrition, or peritonitis.

*Prognosis.*—This is invariably unfavorable; a fatal issue is a question merely of time, whether the growth be removed or left uninterfered with. The microscope to a certain extent aids us in predicting the probable rapidity of the affection. The more nearly it approaches a hard growth, the preponderating element of which is fibrous tissue, the slower will be its course; the more it partakes of a soft character and shows itself rich in cellular elements, the more rapid will be its progress in molecular death.

Again, the small-celled varieties show a more marked tendency to rapidity of production than those which are characterized by large cells.

*Treatment.*—If the cervix be dilated and a sarcomatous growth be discovered in the uterine cavity, it should be entirely removed by galvano-cautery, écrasement, excision, or the curette, and its base thoroughly cauterized with chemically pure nitric acid or some equally powerful caustic. If the cervix be not

open, dilatation should be accomplished by the use of tents, and the growth attacked by the means mentioned.

The following cases of this interesting affection which have fallen under my observation, will illustrate the remarks just made.

CASE I.—I was called to see Mrs. X., aged about forty-five years, the mother of several children. I found that she had been under the care of an irregular practitioner for eighteen months, during which time she had suffered from excessive metrorrhagia, fetid vaginal discharges, hydrorrhœa, and severe gnawing pelvic pains. At times the vaginal discharges resembled the washings of beef, and contained sloughs of tissue, which were very offensive in odor. Up to about a month before I saw her, she had suffered from violent “bearing-down pains,” but since that time these had ceased, and she had felt comparatively comfortable, though greatly exhausted.

About the same time her physician had made a vaginal examination by touch, and had declared that she had “cauliflower cancer.” Upon examination I found the vagina filled with a pulpy, friable mass, extending from the vulva to the cervix uteri. The passage of the fingers around this, resulted in free hemorrhage and detachment of pieces of the growth. By conjoined manipulation the uterus could be felt above the pelvic brim, as large as if it were developed to the fourth month of pregnancy. Upon removal of a portion of the mass, it was carefully examined for me by Dr. Francis Delafield, and pronounced to be an undoubted instance of sarcoma of the uterus.

Although not with any hope of a permanently favorable issue, I, in accordance with the earnest solicitations of the family, removed all that portion of the mass outside the uterus by galvano-cautery. The way being now clear for an examination of the uterine cavity, this was found much enlarged, and filled with the same kind of material as that removed. By means of a large curette it was emptied by scraping.

To all appearances the portion contained in the vagina had formerly existed in utero, and been expelled by uterine contraction. A certain amount of sarcomatous material was, however, found adherent to the posterior lip of the cervix and upper portion of the vagina.

The patient lived for a fortnight after the operation, and then died from exhaustion.

CASE II.—I was requested by a physician of a neighboring town to see with him Mrs. E., a German woman, wife of a florist, aged about forty years, who had been suffering for the past two years from severe pelvic pains, menorrhagia, with occasional metrorrhagia, and during the last six months from a very fetid hydrorrhœa. She was pale and cachectic, feeble and much exhausted. The pulse was rapid and small, and dark circles existed under the eyes. Upon vaginal examination the os uteri was found dilated to the size of a Spanish dollar, and within it could be touched a fibrous mass of rather friable and spongy character. Conjoined manipulation revealed the fact that the uterus was much enlarged. I proposed to the doctor that it should be emptied by means of the curette, to which he assented, declaring at the same time, however, that he had twice resorted to this procedure, and that the growth had immediately returned.

Placing the patient on the left side, and introducing Sims's speculum, I drew the uterus down by means of a large tenaculum, and rapidly and completely emptied it of its contents. Some of the material thus removed was examined by Dr. Delafield, who declared that it was neither cancer nor a benign fibroid; at the same time he was unwilling to pronounce it positively to be sarcoma. From the clinical aspects of the case it appears to me that it was almost positively of this nature.

The subsequent history of the case was this: the uterus was again filled by recurrence of the growth, sloughing of which gradually took place, and hemorrhage and septicæmia put an end to the patient's life.

I have met with two other cases fully as striking as those just recorded, but their histories are so identical with them that I refrain from detailing them. In their place I record the following remarkable instance of this affection developing itself upon the vulva.

Mr. and Mrs. G., a German couple of the middle class, strong and healthy in appearance, brought into my service at the Strangers' Hospital, by the advice of the late Dr. Moulton, of New Rochelle, their infant daughter, aged eighteen months.

The child was an extraordinarily healthy and beautiful one, and quite well developed for its age. It was born and reared at New Rochelle, and had been in perfect health until three or four months before, when a small tumor had made its appearance on the left labium majus. This had developed rapidly, and at the time I first saw it, was as large as the half of a large hen's egg, bisected lengthwise. Dr. Moulton had taken alarm at the rapid growth and peculiarly elastic feel and glistening appearance of this tumor, and kindly sent the child to me, expressing the hope that I would at once remove it. The base of the tumor extended along the labium majus, its highest point being attached to the rim of the meatus urinarius.

The parents of the child were given a very unfavorable prognosis as to the prospects of cure by operation, at the same time that I urged the propriety of surgical interference. They immediately accepted the proposal, and the operation was performed by me the next day, in the presence of Drs. J. L. Brown, Walker, Mann, and Knentzler. Taking a long, curved needle, I passed it under the tumor from its lower extremity, near the perineum, to its upper at the meatus, and left it in this position, its extremities projecting. A shorter curved needle was then passed under the tumor at its middle, and at right angles to the first. The wire of the galvano-cantery was then passed around the tumor, being held in position by the four projecting extremities of the two needles. Being brought to white heat, the loop was then very slowly tightened and the mass removed. The shape of the needles gave to the wound a concave form, and thus complete removal of the base of the tumor was secured. The child recovered perfectly, but in five months it was again brought to the hospital, the tumor having returned, and being nearly as large as at first. It was removed a second time exactly in the same way, but a second time it returned. The parents, with my concurrence, decided to resort no more to surgical interference, and Dr. Mann informs me that sloughing of the mass soon occurred, and the child died.

This tumor was examined by Dr. Mann, and found to consist of the microscopic elements described by Lebert as characteristic of the fibroplastic tumor, and by Paget of the recurrent fibroid.



SYPHILITIC LESIONS OF THE OSSEOUS SYSTEM IN INFANTS  
AND YOUNG CHILDREN: THEIR CLINICAL HISTORY,  
PATHOLOGY, AND TREATMENT.

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I.—INTRODUCTORY.

THERE is, perhaps, no portion of the field of syphilography, in the study of which less progress has been made, than in that of the lesions of the osseous system in infants and children. Prior to the last few years the statement made by early observers, that such lesions were very rare, held full sway, and the baneful influence of the impression thus produced can now be clearly appreciated in the facts that observers attributed to other diseases lesions of this system which were due undoubtedly to syphilis, and that they did not follow up the study of these cases, because under the weight of the prevailing almost unequivocal statement, it was thought that such syphilitic lesions rarely if ever occurred. In fact, I think that in the whole range of medical literature, there is not a stronger illustration of the blind manner in which acquiescence is given to a dogmatic statement, than that which has been accorded to this. Emanating with early writers upon the venereal diseases of children, whose observations were purely clinical, and which were not matured and confirmed by pathological research, this view has been transmitted from one to another over a long period of years, and it finally came to be accepted as an undoubted clinical truth. Within the past twenty years, the work of Diday,<sup>1</sup> which reiterated this statement, has, perhaps, exercised a most signal influence in tending to spread it. Following him, in didactic treatise, came Vidal,<sup>2</sup> who in his work acquiesced in the opinion, and after them writers upon diseases of children range themselves in an unqualified manner. There

<sup>1</sup> *Traité de la syphilis des enfants nouveau nés et des enfants à la mamelle.* Paris, 1854.

<sup>2</sup> *De la syphilis congénitale.* Thèse pour l'agrégation. Paris, 1860.

are certain reasons, however, beyond this of mere popular belief, which tended to strengthen this view, and these are that the syphilitic lesions of the osseous system in infants presented several strong points of resemblance to the bone-lesions of rickets, and that as they did not in every instance present clear syphilitic features they were attributed to scrofula. As these two diseases were brought out in a salient manner, the idea gained ground, that when osseous lesions occurred in children, they were due to either one of them, and some writers put forward the views that syphilis could cause rickets, and that the two diseases were frequently found in the same patient. Thus it can now be readily seen how unprecise were the diagnostic points thus drawn, and what a great barrier existed in the way to true progress in clinical investigation. I have no doubt but that this confusion has tended to produce some of the discrepancies in opinion which now exist among some observers as to the peculiarities of the osseous lesions of rickets. Thus it happened that rickets and struma were in the majority of cases considered as the diseases causing many lesions of the bones in children, while their syphilitic origin, in many instances, escaped entirely from consideration. In spite, however, of this well-grounded belief and of the reigning confusion, cases of bone-lesion were from time to time reported as being due to syphilis, and the opinion lurked in the mind that such lesions might occur. If this had not been so, it is very probable that the standstill would have been greater than it really was. These reported cases, however, were not numerous, nor, in the majority of instances, were they carefully and elaborately reported, so that they did not afford the material necessary for clinical study and deduction. This was the state of affairs when, in 1870, an important article was published by Dr. G. Wegner, the assistant to Professor Virchow, in Berlin. In it he gave a minute microscopic description of the lesions of the bones in twelve syphilitic children, and he showed quite clearly that the pathological processes are *sui generis*. Besides this, he ventured the statement that such lesions were not rare, but were even quite constant. These observations, though not quite exhaustive, have since been fully confirmed, and, in some particulars, added to by Profs. Waldeyer and Köbner, who also agree with Wegner as to the frequency of occurrence of the lesions. In two years,

subsequently, they were again confirmed by Parrot, in Paris, who gives a point of some value in their clinical history. The grand result of these observations has been to place the matter in a more precise light, to give science a standard to work upon, and to produce an impetus for observation which will finally lead to the dissemination of accurate clinical and pathological knowledge of these lesions. About a year prior to the publication of Wegner's article, a case came under my observation, which, at the time, greatly interested and puzzled me. It led me to search literature thoroughly, and I finally found a few cases, which convinced me that my own was one of syphilitic origin. One of these cases, that of Ranvier, was accompanied by some interesting pathological details. Early in 1870 I read Wegner's article, and it fully confirmed my view, and it has since greatly assisted me in clearly interpreting various features of other cases, which have, fortunately for me, fallen under my notice in the various public charities with which I am connected, through the kindness of friends and in private practice.

Though Wegner's article lends much assistance in the study of these lesions, the aid is wholly in the matter of pathology, as no clinical facts are given. Then again, on this portion of the subject, it is not exhaustive, as it treats mainly of a certain form of lesion found at the junction of the diaphyses with the epiphyses of long bones, and it does not consider, at equal length, the syphilitic lesions of the short and flat bones; therefore it is a contribution to a portion of the subject. Parrot's articles combine clinical and pathological facts, but in the former field he confines himself mainly to the appearances induced by separation of the epiphyses from the diaphyses, describing the resulting condition, a loss of motion, as a pseudo-paralysis. Antecedent and advanced stages are not touched upon, nor does he enter upon the study of diagnosis. In fact, it must be confessed that his papers are narrow in scope and desultory in conclusions.

Wegner's article is certainly one of the most important recent additions to our knowledge of syphilis, and one which, by positively stating the fact that these lesions are not uncommon, will tend in future to call attention to their study. It must, however, be said in justice to Ranvier, that he sketched the

same pathological processes some years before, and showed how syphilis might affect the bones. The great point in Wegner's performance is the fact, that he cited a greater number of cases, and that he based his observations upon a large field of research. These observations and the occurrence under my care of twelve cases, and the opportunities of observing several others, have led me to study the clinical history of these lesions with great care and attention for the past four years. I have also been fortunate in meeting with cases, which, though not of syphilitic origin, have suggested points of resemblance, and have materially assisted me in my studies of their diagnosis. I have, therefore, endeavored with this material, which will be seen to be quite ample, to trace the development, course, and decline of these lesions, and the various concomitant circumstances which attend them, and to give, if possible, a complete picture. The lesions due to hereditary syphilis in infants are quite fully described, as the cases are quite numerous, and the question as to whether similar lesions could be developed in the acquired syphilis of infants and young children is, I think, quite fully settled in the affirmative, as two illustrative cases are given. This is a subject of considerable importance, and until now not treated of, though the opinion was entertained on very insufficient ground that such could not occur. The impression will be conveyed, I think, by our study, that the lesions as observed in the infant are such as may be engrafted on the bones in a greater or less degree during the whole period of their development; and this is another point of very great pathological import. Then again, in the study of these various cases, it will be found that two show quite clearly a complication of great interest, namely, separation of the epiphyses from the diaphyses. This is a condition attended with much important consideration, and one which has yet not been clearly brought out. In fact, the two cases hereafter detailed, are the only ones on record which show the course of the lesion and its ultimate results in a subject which survived the disease. In a surgical point of view, these cases are of considerable importance. I give the history of my cases as well as those of every reported case in as succinct a manner as possible. Many, if not all, of the cases reported by others lack very essential particulars in their history, and they are chiefly valuable from the fact that they call attention to bone-swellings. I have en-

deavored to bring out every point mentioned by the various authors, and to show their importance by a comparative examination of them. The result will be found to be, if not an exhaustive treatise, certainly a suggestive one, and one in which the essential points of these lesions are set forth. It occurred to me that perhaps I occupied too much space with the cases; but as they are the store-house from which the deductions are made, and as they may serve in future a useful purpose as prototypes, I have given them all without unnecessary words. Another reason which led me to do this was, that these cases have never been before united in a collection, and as I have been careful to draw them from the original sources, I have thought that they might be of use for future reference. Though the commentary and cases hinge the one on the other, they of course may be read separately, the descriptions being given in a didactic manner in the commentary, while the clinical features may be grasped from a perusal of the cases. In this clinical department, as I have said, the contributions have been scanty, and the deductions have heretofore been wholly wanting.

I have taken pains to review the field of pathology carefully, and I give original illustrations, which I think will fully explain in a simple manner the various changes. Though I give the views and observations of other observers, I have also given my own, which in one or two particulars have cleared obscure points. The sections upon diagnosis and treatment are as complete as I could make them. I shall give my cases first, and after them place those of the various other observers.

## II.—THE HISTORIES OF PERSONAL CASES.

CASE I.—James B. came under my observation at the College of Physicians and Surgeons in May, 1872. The patient was then a little more than three months old, and though not very fat, still was not thin, and was quite compactly built. Its mother informed me that it had always nursed well, and that its general health was quite good. In answer to inquiries, I learned that it had not had any night sweats of a local character, and that it had not suffered from fever at night, during which period it usually slept quite well. The mother's history was as follows: She was thirty-five years of age, and had been

married twelve years. During the first nine years of her married life she had given birth to three healthy children, who are now living. In the tenth year after her marriage she had "sores" upon the genitals, which were followed by a general condition of ill-health; and she also noticed a roseola of a persistent character, and mucous patches, and condylomata. In the two years succeeding this syphilitic infection she had two miscarriages at five months without any known cause. Within a year after that her health improved markedly, and she then became pregnant with the present child. The father was a very uncommunicative man, and I failed to get his history.

The child had the snuffles very severely when about a month old, but no rash was observed. When it was six weeks old, the mother noticed that the bones of the forearms were enlarged just above the wrists. These swellings grew gradually larger, and when they had existed six weeks the child came to me. On very careful examination I found a slight papular syphilitic rash, with evidences of a declining roseola. These cutaneous manifestations were quite clear, and were regarded by me and by my friend, Dr. H. B. Walker—who was present at the examination—as undoubtedly syphilitic. They had evidently escaped the notice of the mother, but had certainly existed several weeks. The cranium was normal in every particular, as also were the ribs. As the child was not very fat the swellings on the forearms were quite readily seen. The two bones of each side seemed joined together by a deposit of firm tissue, which was evenly distributed around their lower ends. At this enlargement the interosseous space was not discernible with the tip of the finger, though it was readily found above this point. The surface of the swellings was in their greatest extent smooth and rounded, beginning abruptly from the shafts of the bones, and then forming a decided elevation of fully half an inch, and merging into and being lost in the expanded epiphysis. The swellings on the ulnæ were very plainly marked just above the styloid processes, which were lost in them. The integument was slightly stretched, but was normal in appearance, and could be slid easily over the swellings. The parts did not present any perceptible elevation of temperature. Upon manipulation no uneasiness seemed to result, and there were no evidences of the presence of spontaneous pain. The mother stated that the

swellings had attained their present size in a month after she first noticed them, and that for a fortnight she had observed that they did not increase in size. I prescribed for the child the mixed or combination treatment, composed of bichloride of mercury, one grain; iodide of potassium, four drachms; syrup and water, each two ounces: of this mixture it was to take six drops three times a day. In June the cutaneous lesions had disappeared, and, as the medicine was well borne on the stomach, I increased the dose to ten drops; there was no perceptible diminution in the size of the bone-swellings. The dose as thus increased was continued during the month of July with very little irregularity, owing to temporary diarrhoea, and in August the swellings were unmistakably smaller in size. This diminution in size was most marked at the ulnæ, as it became possible to define the contour of the styloid processes. Though the osseous lesions had been benefited by the treatment, the general condition of the child was not very good. It had become pale, and flabby, and thin. Yet it had never manifested any disturbance of the gastro-intestinal tract, nor had it showed any particular morbid symptom. I also noticed a tendency to lateral expansion of the skull similar to that of chronic hydrocephalus. This led me to examine the bones very carefully, and I could not find the least abnormality about them. I examined the ribs again also, but they were normal. Under these circumstances I reduced the dose of the mixture to six drops, and ordered that it should take besides one teaspoonful of the sweet wine of iron, and a similar quantity of cod-liver oil. In September a pustular syphilide and mucous patches were observed. In November I saw the child for the last time. The enlargements of the bones had almost wholly disappeared, and their contours could be clearly defined. Upon the radius, at the diaphyso-epiphysal junction, there was a slight ridge of a height of about two lines, and a breadth of about a quarter of an inch. Upon the ulnæ very slight upliftings of the surface of the bone were felt just above the styloid processes, which seemed normal. At this, the last visit, I saw that the enlargement of the head had got rather more prominent, but there was no alteration of the fontanelle. The general condition of the child was very bad; its skin was wrinkled and scurfy, and the subcutaneous fat was nearly all absorbed, and the muscles were

wasted,—in fact, it seemed profoundly cachectic. I am convinced that it died soon after, as its mother attended so regularly before.

CASE II.—John B., a male child three months old, was brought to the Woman's Medical College of the New York Infirmary, and was transferred to my clinic on the twenty-fifth of November, 1872. At that time I ascertained that its mother had been syphilitic nearly two years, but I could obtain no history of the father. Upon examination I found a roseola and papular roseola of undoubtedly syphilitic origin, upon the trunks and extremities. The body of the right testicle was enlarged to more than twice its natural size, and there was an hydrocele of the tunica vaginalis. The distal ends of the bones of the forearms were also the seat of morbid changes. Thus just at the junction of the diaphysis with the epiphysis of each bone an enlargement was felt, which began quite abruptly and attained a height of fully half an inch, and merging into was lost in the expanded epiphysis. The surface of the swelling was perfectly smooth, and when carefully examined, both radius and ulna seemed soldered together by a new deposit. The swellings corresponded in size on each arm. If they had not been carefully sought for, these enlargements would have escaped recognition, as the child was quite fat and at each wrist it was particularly so. The treatment consisted in the administration of one grain of hydrargyrum cum creta and of one grain of iodide of potassium at intervals of half an hour between each dose three times daily. The testicle received proper treatment. The cutaneous lesions disappeared, and in six weeks there was a marked diminution in the size of the enlargements. I have since learned that the treatment was continued for two months longer, and that then no swellings were perceptible upon the bones. There was not at any time any apparent impairment in the use of the limbs, and the joints were not involved. The case also presents an interesting feature, as showing the development of a sarcocele in a hereditarily syphilitic child, a lesion, the existence of which was once denied. The fontanelles were normal, as were also the ribs and skull-bones. The child had not had local nocturnal sweats, nor had it suffered from gastro-intestinal disturbance.



CASE III.—Mary J. came under my observation on the twentieth of October, 1871. She was then about two months old. Her mother was found to be syphilitic, and had been infected about six months; that is, in the fifth month of pregnancy. Her lesions were of a severe character, and she seemed very much debilitated. She had been treated for syphilis for about three months, but not very actively. She stated that shortly after the child's birth it had had a dark rash, which had continued to exist, and that its mouth had been very sore, and that it was very restless at night, seeming to be in pain. Upon examination I found that the child was quite well developed, and tolerably fat. The eruption alluded to was a roseola, which had become coppery in tint, and was evidently declining. There were two mucous patches in the mouth, and a condyloma latum upon the margin of the anus. Upon examining closely the various bones of the body, I found that several of them were the seat of enlargement. At each wrist there was a very evident swelling, which began abruptly from the shaft of the bone, and then attaining a height of about three-quarters of an inch, having a smooth surface, merged into the expanded and enlarged epiphyses. The swellings were perfectly symmetrical in size, and an examination of them gave the impression that both bones were welded together with an encircling tissue. At the lower end of the shafts of the tibia and fibula a similar condition was found. Here, however, the swelling was less abrupt from the shaft, and the enlargement of the epiphyses was much more considerable in comparison. Both bones seemed to be joined together inseparably; in fact, at their two ends they had a somewhat quadrangular shape, and their surfaces were smooth. Each malleolus could be clearly made out, at its lowermost part, as normal in shape; consequently the process had only involved its upper part. No other bones seemed to be involved. The mother was unable to give a history of these bony tumors. She had not recognized those of the wrists, probably owing to the fatty tissue, but she thought that the condition of the ankles was not natural. The movements of the arms and legs were apparently performed normally. I ordered for this child five drops of the mixed treatment three times a day; but I only saw it once after, and then, as but three weeks had elapsed, no apparent change had been produced.

I afterwards learned that it had died early in December, of a pulmonary trouble.

CASE IV.—I was asked by its uncle to see P. C., a male child aged fourteen months, on the 10th of July, 1873. I found it to be a quite delicate child, but not remarkably thin. Upon each side of the frontal bone was a very prominent swelling, and this condition was the cause of my visit. Besides these bone-swellings there were enlargements of the bones of the forearms. An inquiry into the history of the case brought out the following facts: The child had been well at birth, but when a month old it had been covered from head to foot with a rash, had had snuffles very badly and for a long time, and had a very severe inflammation of one eye. When three months old the swellings on the forearms were noticed, but up to that time the child had nursed and slept well, and in spite of its lesions had grown proportionately. It had never had fever nor sweats at night, but when its nose was stopped up with the coryza its respiration was sometimes a little impeded. At this time it was treated by a village physician, who evidently regarded the case as one of rickets. When the child was six months old, the node on the right frontal eminence had been noticed, and in about three months after, that on the left formed, or rather was noticed. The treatment followed, as nearly as I could ascertain, consisted in the administration of quinine, iron, and cod-liver oil. It was nursed by its mother until three months before the time at which I first saw it, and after that was fed on milk of good quality. In January, 1873, it had suffered severely from sore mouth, and the lesion being persistent, it was touched several times with nitrate of silver stick. An examination of the case resulted in obtaining the following facts: The cranium was normal, except at the points mentioned. There were no evidences of thickening of the bones at any of the sutures, no soft spots or depressions upon any of them, and the fontanelle was not abnormally large. The node on the right side of the frontal bone was nearly three-quarters of an inch in all diameters, it being quite round. It was elevated above the plane of the skull nearly one half-inch, and had abrupt but even borders, and its surface was smooth. The node on the left side was about half an inch in diameter, and it corresponded exactly to

its larger fellow. The integument over both swellings was, though slightly stretched, normal, and not in any manner adherent. At the line of junction of shafts with the epiphyses of the radius and ulna was a well-marked ring of bone. The upper border of the ring began abruptly at the shaft of the bone, and attaining a height of half an inch, bevelled off again into the epiphysis, having occupied an area of about three-quarters of an inch of the continuity of the bones. When examined from the wrist-joint upwards, the swelling was not as abrupt as it was when felt of from above. This was due to the expansion of the epiphysis. The surface of this ring was smooth, and over it the integument, which was normal, could be readily slid. As the child was not very fat, the swelling could be seen very plainly. The lesion was symmetrical on both bones of both forearms. Upon the ulnae, just above the styloid processes, the swellings were particularly well marked, and their lower borders fused into and enveloped the upper part of the styloid processes. The ribs were normal, and no other enlargement was found upon any of the bones. The wrist-joints were not at all impaired in their motion. Upon the inner side of the left labial commissure, the mucous membrane was very much thickened, of a white color, and cracked in various directions. There was a slight opacity of the left cornea to the right and above its middle part.

The mother's history was as follows: She had been married three years prior to the birth of the present child, during which time she had twice miscarried. She had become ill soon after marriage, had some eruption of the skin, and suffered severely with sore-throat, or as she called it, diphtheria. She also had had condylomata around the vulva. She had not been treated regularly. The father was said to suffer from rheumatism.

I prescribed the same mixture, combining the bichloride with the iodide of potassium; and ordered that the child should take ten drops three times daily, and to increase the dose in a month to fifteen drops.

As the child lived in the country, I did not see it again for a month, at which time I learned that the medicine had been given quite regularly, except an intermission of a few days, owing to diarrhœa. At this examination I found that the nodes were somewhat less elevated—a fact which could be seen by the

eye as well as appreciated by the touch. As there was no marked change in the swellings on the forearms, I ordered that they should be rubbed every day with ung. hydrarg. The dose was then increased to fifteen drops. This line of treatment was followed until November, at which time I saw the child again. The nodes had entirely disappeared, and on the site of their former position a distinct depression of about one-third of a line was found involving their whole area. This fact was well shown on both frontal eminences. As the tip of the finger was passed along the surface of the frontal bone it would slide suddenly into these depressions. The former rings of bone on the radius and ulna were now almost imperceptible ridges. The general condition of the child was good.

CASE V.—The history of the next child is somewhat incomplete as to the course of the lesions under the influence of treatment, but still it presents other interesting points.

T. C., a male child, aged two months, came under my observation in September, 1872. I had treated its mother for secondary syphilis about a year previously; its father was not examined by me, nor could I obtain any history of him. The child when first seen was covered with a very confluent roseola, had severe eczema of the genital and anal region from the irritation of a number of neglected condylomata, and it suffered from aphthae of the month. The bones of the forearms were the seat of change at the junction of the shaft with the distal epiphysis. The swelling consisted of what appeared as a ring encircling both bones; it had fully three-quarters of an inch of area, and was raised a little more than half an inch. At the seat of lateral opposition of the two bones the swelling was so much developed that they appeared as if fused together. The surface of the swellings was nearly smooth—not at all ridged. The integument above was uplifted, and the tumors were clearly visible, as the child was quite thin. At the head of the radius and ulna on each arm a similar but smaller ring of bone was found encircling each; but they would have escaped attention if not felt for, as they did not produce any bulging of the integument. The swelling on the ulna was more perceptible on the back of the arm, at the base of the olecranon process. There was no impairment in the use of either limb.

At the junction of the shafts of the tibia and fibula of each leg with the lower epiphyses was a ring of bone similar to that observed on the arm; and there was a similar elevation of the integument, which was very perceptible just above the ankle. The remaining portion of each malleolus appeared as if unaffected. The integument was slightly stretched, but normal. No other bones appeared affected. This child had been vaccinated when a month old, and its mother thought that all its trouble resulted from that. I ordered for it an appropriate treatment; but I never saw it again, as its mother left the city.

CASE VI.—The mother of the next child presented a clear syphilitic history, she having been infected at about the fifth month of pregnancy, her husband having then become syphilitic. When first seen by me she presented well-marked syphilitic lesions. She came under my observation on the 1st of June, 1871, having been sent to me by my friend Dr. W. H. Draper. Her child's history is as follows:—

Matilda C. came under my observation June 1st, 1871, she being then six months old. At birth she presented no lesions of the skin, and was seemingly a well-developed child; but when a month old she was afflicted with a roseola, mucous patches, and snuffles—all of which disappeared, and were replaced by a general papular syphilide. When the child was six weeks old its mother noticed that its right middle finger was somewhat enlarged, but she could not obtain any evidences of pain. The enlargement slowly increased for two months, when the skin covering the first phalanx became slightly red, thickened, and tender, and very tense from pressure within. This inflammation of the integument and enlargement of the bone progressed very slowly, and at the end of ten weeks—which would be the fourth and half month of the existence of the trouble—fluctuation was discovered, and an incision was made by a surgeon on each side of the finger, thus liberating a quantity of pus. At this time the patient came under my care, and the right hand presented the following appearances: The middle finger was greatly swollen, being fully an inch in all diameters, and having a circumference of two and three-quarters inches. The diameter of its fellow was one-third of an inch, and its circumference slightly less than an inch. The finger was markedly flexed, and

could not even by pressure backwards be fully extended—a condition which was due to the tension produced by the swelling upon the flexor tendon. The fore and ring fingers were very much separated, and were rendered unwieldy by their abnormal position. This was very noticeable when the child clasped any small article between the thumb and forefinger. The ulcers which resulted from the incisions had a sloughy base similar to that observed in ulcerating gummata, were surrounded by a livid, undermined edge, and they secreted considerable quantities of a sanious pus. The inflammatory condition of the adjacent integument was quite well marked. There was no evidence, nor had there been, of spontaneous pain; but the finger was sensitive to handling, as evidenced by the distressed look of the child's face. According to the mother's statement, the child nursed and slept well, and its strength was not impaired. The mother was placed upon appropriate anti-syphilitic treatment. For the child I ordered a grain of hydrargyrum cum creta three times daily, and treated the ulcers by slightly pencilling them with a solution of nitrate of silver, and the continuous application of an ointment composed of ung. hydrarg., two drachms; ung. simpl., six drachms. During the month of June very little change took place in the finger, but the cutaneous and mucous lesions disappeared. At the end of July it was noticed that the ulcers discharged less, that their edges were less everted and undermined, and that there was a diminution in the circumference of the phalanx of one-quarter of an inch. This was probably due both to the lessened size of the bone, and also to the less thickened condition of the integument.

During the month of August there was also an improvement, the finger being an eighth of an inch less in circumference. During the early part of this month the child had taken the powder only ten days, in consequence of a gastro-intestinal disorder, and later in the month they were replaced by the mixed treatment. I had been testing the progress under a strictly mercurial treatment.

The case progressed favorably during the months of September, October, and November, for during this period the bone became markedly less swollen. The ulcers, however, did not wholly heal, and required stimulation once a fortnight as exu-

berant granulations appeared on their floor. It was then evident that the healing process at the base or floor of the ulcers was seated directly upon the bone, and there was a tendency to very slight contraction or bending of their edges towards the bone. Early in January these ulcers were fully healed, and they left behind a thin cicatrix on each side of the finger, which by its central part was adherent to the bone. At this time the finger presented the following appearance: It was three-eighths of an inch longer than its fellow of the other hand, owing to elongation of the first phalanx, which was flattened laterally, so that its transverse diameter was a little less than half an inch, while its antero-posterior diameter was about three-quarters of an inch. The mobility of the finger seemed perfect, and the child was able to grasp any article with the hand with normal power. In the management of the case I found it advisable—as the progress previously was not satisfactory to me, the treatment however being somewhat experimental—to change the simple mercury for a combination of iodide of potassium with mercury. The child took for six weeks five drops, and after that to the period of cure ten drops of a mixture composed of bichloride of mercury one grain, iodide of potassium four drachms, mixed with four ounces of syrup. I should add that there were periods varying between a few days and a week, that the mother failed to give the remedy; but she was upon the whole faithful to her duty, considering the length of time occupied by the treatment. Besides the lesion of the phalanx above described, there was a similar trouble of one of the metatarsal bones of the left foot. In July the mother noticed that this foot was wider across the instep than its fellow of the opposite side; and I found by measurement that such was the case, there being half an inch greater circumference at this point than on a similar point on the other foot. This swelling gradually increased, in spite of gentle pressure continuously applied, until the 14th of August, when the tumor was quite large. As far as a careful examination would reveal, I inferred that one of the cuneiform bones, perhaps the middle, was the seat of disease. There was a considerable hydrarthrosis in the articulation between the cuneiform and scaphoid bones. There being evidences of fluctuation over the middle cuneiform, I made an incision into the most prominent part of the swelling, and

gave vent to about a large teaspoonful of thick healthy pus. The resulting ulcer was of similar appearance to those of the finger, and was a very long time in healing, it being treated in a similar manner. The effusion into the joint was slowly absorbed, the pain ceased, and in December the ulcer had filled up and was covered by a cicatrix, which was slightly adherent to the bone beneath. Upon manipulating the joint I found it was less mobile than natural, but I felt convinced that this condition would gradually cease by exercise of the parts. The abscess of the bone had not resulted in any very perceptible loss of tissue, and it was a matter of surprise to me that the reparative processes had been so perfect. At my last observation of the child, January 5th, 1872, its syphilitic lesions had wholly disappeared, those of the osseous system having lasted respectively eleven months in the finger, and six months in the foot.

The mother of the two children, the history of whose cases now follows, came under my observation in November, 1870, she being sent to me by my friend, Dr. W. H. Draper. She was then in the seventh month of her third pregnancy, and was also in the first year of syphilis. She had been infected by her husband when about three months pregnant, and when first seen by me, having been syphilitic about four months, she was suffering very severely with angina and laryngitis. She had become markedly emaciated, and was very weak. About the vulva were large masses of very much hypertrophied condylomata lata, which had the bluish congested appearance of these lesions when developed during the gravid condition. Her body was covered with a very copious papular syphilide, and there were slightly pigmented spots over the whole surface of a roseola which had been her first rash and had faded. There was a very well-marked cranial alopecia, and on each angle of the lips was a fissure which commenced in a mucous patch on the inner surface of these parts. Under the circumstances, I placed her upon an active mercurial course combined with tonics; besides this, the lesions of the mucous membrane were treated locally. Early in January, 1871, she was delivered of a female child, which at birth was well developed, and did not present any evidence of syphilis. The mother had a severe relapse of her syphilis in March.



I examined the father in December, and ascertained that he had had a chancre and secondary lesions within the year.

CASE VII.—Mimmie C., the infant daughter of this woman, was brought to me in March of the same year for treatment. I ascertained that, when a month old, the child had had roseola, mucous patches, and coryza, and at this time she had become cross and peevish. The urgent symptoms, when seen by me, were the coryza, mucous patches, and emaciation of the child. I ordered it, then, appropriate internal and local treatment, and did not see it again until about the middle of June of the same year. At this time I observed serious lesions of the bones and joints, and that the mucous patches in the mouth still persisted. The child's left arm was semiflexed, and it showed a disposition to protect it from handling and from any slight blow. Its mother said that it had held it in this position for nearly two weeks, and that it was evident that it was painful. Upon examination, I found that the elbow-joint was swollen, and that it was very hot to the touch. There was a swelling in the upper part of the olecranon process, which was uneven, particularly on its superior surface. This swelling, which I could distinctly define as belonging to the bone, was fully as large as a chestnut. There was considerable effusion into the elbow-joint, which was most perceptible to palpation on its posterior aspect. Though I used some force, I was wholly unable to fully extend the arm. On the other arm I found a swelling, about the size of a pea-nut, just above and almost upon the internal condyle of the humerus. The swelling was not very prominent, and to the touch appeared smooth and rounded. There was no impairment of the use of the joint, no perceptible effusion, and no unnatural position of the limb. On the same arm I found a slight enlargement of the radius, just above its styloid process. This swelling seemed to be developed around the circumference of the bone. There was no interference by it of the working of the wrist-joint, or of pronation or supination. Upon the right leg involving the portion of the tibia and fibula which correspond to the point of union of the lower epiphyses with the shafts was a large swelling just above and merging into each malleolus which appeared somewhat quadrangular. Though carefully examined

by me, I could not, by tracing the longitudinal outlines of the bones and following down with the tip of the finger in the space which is normally definable between the bones at their lower end, make out their outlines at all. The impression conveyed to my mind was, that the swelling had extended around and between the bones, and had here bound them together. The bones of the left leg were not involved. I ordered a local application of a roller bandage, saturated with an evaporating lotion, to the left arm, leaving the other swellings to be influenced by internal treatment. For the latter purpose I prescribed a mixture of bichloride of mercury one grain, iodide of potassium four drachms, syrup and water of each two ounces; of this the child was to take ten drops three times daily. July 15th, child was brought back. Its general health was improved, and its mother thought that it was better, as it was not as fretful as it had been. The elbow-joint was not as perceptibly swollen as when seen last. The bone presented the same enlargement at the olecranon, but there was less effusion into the joint, and mobility was slightly increased. During this interval of three weeks, the bandage had been applied by the child's mother every day, and she had ceased applying the lotion according to my directions, when heat was not perceptible in the joint. The dose of the mixture was now increased to fifteen drops three times a day.

In two weeks there was perceptible diminution in the size of the various swellings, particularly in the left elbow-joint, which was more mobile, and in the right tibia and fibula. The dose of the mixture was again increased to twenty drops three times a day. Though the weather was quite warm, the child had not discontinued its medicine, as it had not suffered from any gastro-intestinal trouble.

Late in the month of August, the lesions of the bones having then existed nearly three months, and when the child had been under active treatment fully two months, very marked improvement was noticed in these parts. The dose was continued at twenty drops for a month longer. In September the left elbow-joint was, to all appearance, normal, and the swellings on the various bones had entirely disappeared. They had not left any material change in the shafts of the bone, either by increase or loss of tissue, and careful examination failed to reveal any

abnormal condition whatever of the portions previously the seat of disease. The whole treatment had occupied three months, and the lesions of the bones had existed nearly four months. During this time the child had suffered from mucous patches in month. The integument over the various bone-swellings was normal. The general health of the child was much improved.

CASE VIII.—Lorette C., the sister of the child whose history is just given, was brought to me on the 7th of June, 1871; I then learned that she had been perfectly healthy until a month before, since which time she had suffered from what her parents supposed to be rheumatism. When first seen by me she presented a papular syphilide upon cheeks and forehead, a declining roseola on the body, mucous patches in the mouth, and condylomata lata around the anus. The child suffered most severely at night, when she slept very little. The painful points were the lower end of the left radius, the upper part of left ulna, and the metacarpal bone of the right index finger. At this time the parents suspected that syphilis was the cause of the child's suffering, as the father had been similarly afflicted, and this caused them to bring it to my office. As I knew that this child had not been syphilitic very long, and that it must have acquired its disease, I carefully examined for the initial lesion, and I found that there was an ulcer, sluggish in character and slightly indurated, on the inner aspect of the lower lip, which was accompanied by an enlargement of the submaxillary gland of the same side. I learned that its father had noticed it a month before, and had touched it occasionally with a solution of nitrate of silver, which he used for the mucous patches of the other child, whose history precedes this. The mucous patches of the baby sister were undoubtedly the source of the contagion of the present child.

Upon examination I found that the metacarpal bone just mentioned was greatly enlarged, and presented a perfectly oval shape. At its middle it was about an inch and a quarter in diameter, from which point it gradually shaded off on each end, and at its articulation on each end there was scarcely any enlargement perceptible. This bone, thus enlarged, completely filled the triangular space which exists normally between it

and the metacarpal bone of the thumb. Upon the palmar surface, the swelling was also quite perceptible, while upon the dorsum of the hand the swelling stood saliently out. To the most casual observation it was perfectly evident that the swelling was accurately limited to the region of the second metacarpal bone, for just beyond this region, on the portion of the back of the hand where the third metacarpal bone was situated, a distinct depression was seen in consequence of the abrupt shading off of the tumor. On the palmar surface it was evident that the swelling was distinctly localized in the second bone, and if the child was told to flex the thumb towards the base of the little finger, or if this was done for her, it was seen that in consequence of the swelling she could not quite place the tip of her thumb on that site, but that a space of half an inch intervened between the two, whereas, on the left hand this movement was very readily accomplished. To the touch it was quite evident that the enlargement was confined exclusively to the bone, as this structure could be defined in all its relations to the surrounding parts. The swelling was perfectly even on its surface and the integument, which, though slightly stretched, was normal, and could be slid very readily over any part of the swelling. Upon manipulation pain was produced in this swelling, but the child said she was very much troubled with pain at night, but not during the day.

At the lower end of the left radius, just above the styloid process, was a swelling which encircled the bone, but which I could define clearly as not involving the ulna. This swelling was rounded and smooth on its surface, and was comparable to a round ring having a width of about three-quarters of an inch and being about half an inch high. The swelling on the ulna was upon the sides and posterior aspect of the olecranon process; it was about the size of that on the radius, but it was irregular on its surface. Both of these tumors were painful on manipulation, and they rendered the child alert as to where she placed her arms, and to avoid having them struck.

I ordered this child to take fifteen drops of a similar mixture to that ordered for her sister, and at the end of a week her pains had ceased and the parts could be manipulated more freely, as they were less sensitive. On the 8th of July, having taken the medicine regularly for a month, the size of the af-

affected metacarpal bone had diminished to nearly three-quarters of an inch ; there was a corresponding diminution in the size of the other. The dose of the mixture was then increased to twenty drops three times a day, and I may here say that during the whole period it was faithfully administered. In the early part of September these bone-lesions had entirely disappeared. I was not able to determine any difference in the size or shape of either of the second metacarpal bones, and the radius and ulna, which had been affected, were not perceptibly abnormal. At the time this case and that of the sister whose history immediately precedes it, were under my observation, I was struck with the peculiarity of the almost simultaneous coincidence of the development of osseous lesions in sisters, the one a victim of hereditary, the other of acquired, syphilis.

CASE IX.—James McE. came under my observation in September, 1870. His father had been under my care for about fifteen months at the New York Dispensary, he having suffered severely from syphilis during that time. The history of the syphilis in the mother was quite clear, she having been infected about a year previously. The child, which was the first, was born early in July, appearing well at birth, but breaking out with a general rash when about two months old. On this point I could not get positive information, but the mother thought that the child did not have a rash until then. It had at that time also snuffles, and was treated by my friend Dr. Grunhut, one of the physicians for children's diseases at the New York Dispensary. When first seen by me in September, the child seemed quite well developed, having considerable fatty tissue upon the body. It nursed from its mother's breast wholly, she having an abundance of milk. There was no history of any gastro-intestinal disorders, nor of any morbid symptom except the snuffles, with which the child had suffered severely. It had grown in weight during its life, and certainly looked well nourished. The anterior fontanelle was not abnormally large, and the others were closed. There were no soft spots or thinned places on any of the cranial bones. My questions also elicited the facts which follow. When about two months old, the mother observed that the bones of both forearms became swollen just above the wrists. Very shortly afterwards the bones

of the legs swelled near the ankles, and a swelling was found under the left knee. The swellings increased in size quite rapidly for a month, at which time Dr. Grunhut mentioned the case to me, and transferred it to me for observation and treatment. The child was three months old when first seen by me. I found the distal ends of the radius and ulna much enlarged, the swelling upon the bones reaching fully a half-inch, and being about three-quarters of an inch long, and involving all the sides of the bones. They appeared as if fused together. The swellings on the ankles were as follows: the right fibula was enlarged at its diaphyso-epiphysal junction, in the form of a quite prominent swelling, which began abruptly at the shaft and ended, after attaining a height of over a half-inch, by fusing into the epiphyses. The ends of the malleoli were not enlarged. On the inner side the swelling seemed to coapt closely with the tibia, which, however, was not at all swollen. On the left tibia a precisely similar, but proportionately larger swelling was found, while the fibula was normal. Upon the upper part of the right tibia a quite large swelling was seated. It began about at the apex of the tuberosity, and could be traced around the bone from the fibula to its posterior portion, where it was not perceptible to the touch. Its surface was quite uneven, and its lower edge began abruptly, and it ended by its upper part at the joint. It was much more clearly defined if viewed when the leg was considerably flexed than if it was extended. The ribs were normal, as also was every other bone. I prescribed for it six drops thrice daily of the mixture already spoken of, making no local application. The child came regularly to me for a month, at which time I increased its dose to ten drops. At this time, Oct. 15, there was a decided diminution in the size of the swellings. I then lost sight of the child until early in January, 1873, when I sought it at its home. I found that the progress had been very unfavorable in the ten weeks which had elapsed. Over the swelling of the left radius I found an ulcer of a diameter of half an inch and a depth of a quarter of an inch, with very red undermined edges, a grayish sloughy base, and secreting a copious amount of unhealthy pus. If the edges of the ulcer were moved with the tip of the finger, it could be seen that they would slide over the bone to a slight ex-

tent, and that the base was evidently seated upon the bone. The skin for fully three-quarters of an inch around was thickened and of a dusky red color. I inferred from these facts that the ulceration had been induced by degenerative changes in the bone-swelling. I should add that this ulcer was seated on the back of the wrist, and that it encroached slightly towards the styloid process of the bone. On the right wrist, over the radius, the integument was very much elevated, and from its redness it appeared as if the seat of an abscess, and at its centre fluctuation was distinctly felt. On the outer side of right ankle was an ulcer of the same general appearance as that on the left arm, but it was somewhat larger in size. On inner side of the right ankle a very minute ulcerated opening in the integument was seen, from which a thin, gummy fluid could be made to escape. As far as I could learn, the swellings had increased in size about a month or six weeks previously, and that they had formed the ulcers seen at this time. The treatment had not been followed for two months. This was owing to the intemperate habits of the mother. I opened the abscesses on the radius and upon the tibia, and a quantity of thin pus escaped. The general condition of the child was good. I touched all of the ulcers with a very strong solution of carbolic acid, and filled them with charpie saturated with the same. Under this treatment the ulcers became much improved in a week, as their sloughy appearance had passed away. I then ordered that they should be thoroughly covered with iodoform once a day, and then well protected with lint. The medicine was resumed in ten-drop doses. Early in February the ulcers were very superficial in character and of healthy appearance. The bone-enlargements were somewhat smaller. The dose of the mixture was increased to fifteen drops. The incisions made in January enlarged and formed ulcers, which, owing to treatment, did not assume the sloughy condition of the first two. During February I found it necessary to touch the ulcers lightly with stick nitrate of silver, as they became covered with granulations when they approached the level of the integument. In March they were all thoroughly healed, leaving slightly depressed red cicatrices, which at their centre were adherent to the deep parts. At this time there was a decided diminution in the size of the enlargement at the head of the

left tibia, and the other swellings were slightly less in size. The medicine was given with tolerable regularity, averaging perhaps two doses daily. It was well borne by the stomach. At the end of April the swellings had all disappeared, and when the diaphyso-epiphysal junctions were examined, the only trace of them was a slight ridge of bone about one-quarter of an inch in breadth. This was well marked on the upper part of the tibia. During the month of March the child had several condylomata lata on the margin of the anus.

CASE X.—Emma N., aged seven weeks, was brought to me by her mother, July 8, 1869, who stated that at birth the child had no appearance of any skin disease upon its body, but that when it was two weeks old it became hoarse and was so much troubled with the snuffles that its breathing was rendered difficult. She had also noticed that about the same time an eruption began to appear on its body, and that very soon after that, perhaps a week, she had observed that some of its bones began to swell. At this time she called her husband's attention to these troubles of the child, and he being under my care for syphilis at the New York Dispensary, mentioned them to me, and I expressed a desire to see the child.

Upon examination I found that a very sanious and fetid discharge issued from the nostrils, and that it had excoriated the upper lip. Upon the arms, trunk, and legs there was a very copious, small, flat, papular syphilide, the eruption being greatest on the trunk and forearms. On the latter site it showed a decided tendency to form circles and segments of circles, a feature which I had never until then observed in the papular eruptions of hereditary syphilis. There were well-marked condylomata lata around arms and vulva, but the mouth was free from lesions. The child was not very much darker than a white child, and its mother, a mulatto, was quite white. It was well nourished, and its muscles, which were quite well developed, were covered with considerable adipose tissue. Upon the shafts of the bones I found some very peculiar lesions. The sternal end of the right clavicle was very much enlarged, beginning at the point which corresponds with the junction of the diaphysis with the epiphysis. The swelling began here quite abruptly, and attaining a height of rather more than half an inch, it ended



quite abruptly at the joint which examination showed to be unaffected. The swelling was perceptible to eye and touch, jutting out slightly beyond the chest-walls and upwards towards the neck. It was very clearly defined when the mother held the child on her lap horizontally, and then let the head fall back without any support. This stretched the sterno-cleido mastoid muscle backwards, and the integument quite firmly over the tumor. The latter structure was normal. At the junction of the second and fourth ribs of the right side with the cartilages, were two quite similar enlargements, though somewhat smaller, being rather less than half an inch in height. The surfaces of these swellings were smooth and did not adhere to the integument. Two precisely similar swellings were found on the left side, involving the second and third ribs. At the lower end of the left humerus was a large irregular swelling which expanded the bone laterally to a transverse diameter of full two inches, and which bulged out posteriorly in a markedly perceptible manner. Just over each condyle the swelling spread out, forming quite a distortion of the bone, and involving it along the condyloid ridge for a space of three-quarters of an inch. The swelling was also developed on each side of the olecranon process and complete extension of the arm could not be produced, and it remained continually in a semi-flexed condition. There was evidently a small quantity of serum in the joint, as two puffy swellings were found just above the olecranon. The integument, which was not at all adherent, was slightly reddened and was perceptibly elevated in temperature. The joint was evidently painful, as the child shrank from its manipulation. At the distal end of the right radius and ulna, a perfectly smooth enlargement of the bones was noticed, which extended up their shaft fully two inches. The ends of the bones seemed as if welded together. The same condition was observed in the other arm also. At the lower end of the left tibia and fibula was a similar smooth enlargement, but in this instance the swelling was very much greater and the deformity was very apparent, resembling somewhat a dislocation of the two bones forwards on the tarsal bones. Upon careful palpation, I discovered a soft fluctuating spot in the centre of this swelling on each side, which corresponded to a point an inch and a half above the ends of each malleolus. The soft fluctuating sensation

was found quite generally over the surface of the tumor, though less so than at the centre. It seemed to follow a line all around the two bones corresponding to a point just an inch and a half above the malleoli, which was the most prominent part of the swelling. Upon further manipulation I discovered that these lower segments of the two bones were detached from the shaft. They could be moved quite considerably in each lateral direction, but I could not assure myself that an antero-posterior motion was produced, owing to the movements of the joint. The lateral motions were attended with soft but distinct crepitation. I used traction on the parts, but I did not satisfy myself that any separation was produced between the upper and lower segments of the bones; the joint-structures seemed to yield, and thus I was unable to localize the point of separation. The upper part of this swelling did not begin abruptly, but it arose gradually from the shaft fully two inches and a half above the malleoli, and became prominently swollen at two inches, as just now stated. In the upper portion the periosteum was evidently thickened. There was considerable tenderness of the parts, as the child cried if they were manipulated. The integument, though stretched, was not involved, nor was it the seat of perceptible preternatural heat.

Upon the right leg a very similar but much larger swelling was found, but in its centre the fluctuation was more distinct, the artificial movements in the various directions were more freely accomplished, and the crepitation was equally as distinct. On the inner ankle it was evident that the integument was involved, for it presented for a space of the size of a silver half-dollar a brawny sensation, was there quite hot to the touch, and was not freely movable over the bony tumor beneath. As this thickened and inflamed part gradually shaded off into normal integument all around it, it was plain that suppuration had commenced in the deep connective tissue. The mother informed me that the swellings had come on during the previous month, but that she had noticed that those of the leg had increased in a very marked manner during the preceding fortnight. Her attention had also been attracted towards a seeming inability of the child to move its feet and legs, and that it did not show a disposition to draw them up. When seen by me the legs lay stretched out as if paralyzed, and the two feet turned in

towards one another, and if they were everted they immediately fell inwards as soon as they were released from the grasp. This position of the feet is noticed in the normal condition to a certain extent, but in this instance it was observed in an extreme degree. If the soles of the feet were tickled, or if the integument of them was pinched with a pair of forceps, a very slight jerking motion was produced, which, however, was localized in the thighs, and was not communicated to the muscles passing from the leg to the feet. As far as I could ascertain by very careful examination and observation, the inability to move the limbs and their apparent obtuseness to peripheral irritation was equal on both. With the exceptions of the bones spoken of, all the others were to all appearances normal. The cranium was normal in every particular. When first seen at this time, I was rather puzzled with the appearance of the osseous lesions, as I knew nothing then about these swellings at the epiphyses as being of syphilitic origin. I ran over in my mind the osseous lesions of rickets, but could not satisfy myself that the case was one of that disease. On consulting authorities I could only find the reports of the cases of Roger and Fournier, which were in a slight degree similar, and upon conversing with friends who had large experience I could gain no information. However, knowing the undoubted syphilitic history of the child and of its parents, I concluded that all of the lesions resulted from syphilis, and placed it upon an appropriate treatment. In the course of subsequent reading I found Valleix's case, recorded in Bouchut's treatise on diseases of children, which presented almost similar features, and then I felt certain of my ground. The somewhat unusual character of the case led me to follow it with much attention and care. The mother was directed to give the child a powder containing one grain of hydrargyrum cum creta three times a day. The nose was to be treated locally. In a week the child was again brought to me, and I found that the cutaneous lesions were somewhat less distinct and that the coryza was benefited. The osseous lesions on the legs were not at all improved, the swellings were even greater, I thought. That of the left leg was larger in size, it having grown more perceptibly, but the integument was not involved, whereas the integument over the other tumor on the right leg at the spot indicated was evidently undermined with

pus. I therefore made an incision into the thinnest part of the skin, and a quantity of thick pus escaped, which, after the parts were moved slightly, was followed by a tenacious secretion, viscid in character, yellow or brownish in color, and of the consistence of mucilage of gum arabic diluted with an equal quantity of water. This fluid was examined with the microscope and found to consist of granular matter and a few myeloplaxes. After the evacuation of the contents of the abscess I again examined the parts carefully. The separation of the epiphyses from the shafts of the two bones could be very distinctly made out, and movements could be produced in both lateral and antero-posterior directions. The crepitation was very distinct, but of a soft character.

In order to preserve the parts, as far as possible, from further inflammation and destruction, I rendered the joint immovable by strapping it well with strips of adhesive plaster, leaving an opening corresponding with the orifice of the abscess, into which I placed a tampon of lint, saturated with balsam of Peru. I then bandaged in like manner the other leg, with a view of preventing disorganization, and perhaps of resolution and absorption by pressure and rest. The elbow-joint was covered with lint saturated in a cooling lotion. At this time I ordered that the child should take three grains of iodide of potassium three times daily, an hour after each powder. This treatment was followed without any alteration for a fortnight, at the end of which time the lesions of the skin had almost disappeared and the coryza was less troublesome. The bandages on the legs having become loosened, I applied others. The discharge from the right ankle had been quite profuse for some days after the operation, but had then become less and was serous in character. The sinus was dressed as before, and directions were given to change the lint twice daily. There was a quite noticeable feature observed in this sinus; it had not grown much larger, and showed no tendency whatever to ulcerate; around its orifice it had become slightly thickened, resembling somewhat the sinuses following suppuration of cervical ganglia. At this time, the child, being ten weeks old and having been under treatment three weeks, was placed upon increased doses, the iodide in four-grain doses, and the hydrargyrum cum creta two grains three times daily. Nothing unusual was noticed

for four weeks longer, at which time, it being the seventh week of treatment, a very marked diminution was found in the size of the swellings on the clavicle, on the ribs, and on the humerns, and the effusion into the joint had been absorbed. This latter effect had been accomplished simply by rest and the application of a cooling lotion. There was also a marked diminution in the size of the swelling of the left ankle, and the epiphysis seemed firmly adherent and continuous with the shaft, and it could be distinctly felt that the consolidation was complete, as no unnatural movements could be produced. The treatment was followed up with tolerable regularity until November, when the following condition was found: The bones of the forearms, arm, and the ribs were apparently of their natural size, but just at the junction of each shaft with the epiphysis and of the ribs with their cartilages a slight unevenness of the surfaces was felt. They had been in this condition fully two weeks. The left ankle was also nearly normal, there only being a slight ridge of bone felt, running transversely around the bones. This ridge, which was about a line in area, and of the same height, was somewhat larger in this situation than those were on the other bones. There was no evidence of periosteal swelling upon the shaft, as had been noticed in July. Upon the right ankle, on the spot corresponding to the sinus, which had closed in the latter part of September, was a small, somewhat star-shaped, irregular fibrous cicatrix, of a rosy-red color, and adherent, but not very firmly, to the bone beneath. During the past month spontaneous movements had been noticed to take place in the legs, and I found that there was scarcely any abnormal turning in of the toes, and that, if the feet were tickled or pinched, they were quite spasmodically pulled up, and with considerable force. During the summer the child had lived in the country, and had grown stouter. At this time the only progressing lesion of syphilis was a mucous patch in the month. Early in 1870 I saw this child again, and then I found that the ridges of bone already described had become almost effaced, wholly so on the arms, forearms, and ribs, and they were extremely slight on the legs. There was only a slight undulation of the surface just at the junction of the epiphyses with the diaphyses.

The history of the father was, that he became syphilitic about

two months before his marriage, having a chancre and rheumatoid pains. He also had lesions of the mucous membranes and a papular syphilide, having a decided tendency to epidermal proliferation.

The mother was married three months before she noticed any rash on her body, and then she suffered severely from condylomata, and alopecia was observed on the scalp and in the eyebrows. The child was born a year after marriage, consequently she became pregnant and syphilitic about the same time. She expressed her opinion that the child had been born two weeks prematurely. She had not been actively treated, having taken medicine during the sixth and seventh months of pregnancy.

CASE XL.—The mother of the child whose history follows presented well-marked syphilitic symptoms. Her name is Kate McM., and she was a person who, though not robust, enjoyed good health, and she was moderately stout. She was married on the 25th of August, 1872, being then in her seventeenth year. Two months afterwards she had ulcers upon the genitals, and in November she applied for treatment at the Woman's Medical College of the New York Infirmary. At this time she presented a general roseolous syphilide, mucous patches, and she complained of rheumatoid pains. Her condition was the subject of a clinical lecture by me upon two occasions. She was placed upon a proper mercurial treatment, which she was urged to follow carefully and faithfully. Her attendance, however, was very irregular, and she probably did not undergo the influence of mercury for more than a month, consequently her syphilis, it is fair to assume, was not properly modified, and she might almost be considered as a patient who had not been treated.

In April, 1873, she became pregnant, and early in January, 1874, she gave birth to a male child. Prior to and during her pregnancy she had enjoyed fair health, and had not presented any severe lesion of syphilis.

On the 17th of February she brought her baby to the college, and stated that it was then six weeks old; that when it was two weeks old she had noticed a swelling of the right ankle, which increased, became red, and an opening appeared in it which discharged some pus. Upon examination, I found the following

appearances: The affected ankle, just over the ends of the malleoli, measured four and a half inches, which was an increase of three-quarters of an inch over that of its fellow of the left side. On the inner aspect, an inch above the end of the malleolus, there was a small opening, from which a small quantity of thin pus flowed. The integument, in the shape of a band encircling and including the ankle from the end of the malleoli to a distance of two inches above, was slightly hyperæmic, the condition not being great anywhere, but being comparatively greatest just around the opening. The enlargement was quite perceptible, and it was also noticed that the leg was abnormally bent, though in a slight degree inwards, so that the bones of the leg were bow-shaped, the convexity looking outwards. This appearance may be noticed to a slight degree in nearly every young child, consequently it must be carefully examined in every case before being pronounced to be abnormal. In this instance, the comparison between it and the other unaffected leg was well marked. This feature was also clearly made out by my clinical assistant as well as several students. It was also observable that the child had very little if any power of using the limb, and its motionless condition contrasted markedly with the active alternate flexion and extension of its fellow. When examined, it was found that the epiphyses of the tibia and fibula were slightly enlarged, that the integument over them was not at all adherent even at the orifice of the sinus, and that there was no perceptible preternatural heat. Manipulation gave the child pain, as it cried piteously, though it had very little power to pull away the leg. The flexed appearance struck me as being peculiar, and a suspicion occurred to me that a false point of motion existed between the epiphyses and the shafts. Holding the epiphysal extremity firmly with one hand, and grasping the leg in a like manner with the other, I was able with very little force to move the two separated segments, the one upon the other, in a lateral direction. We carefully listened for crepitation, but it was not heard, nor was a grating sensation communicated to my hands; indeed, it seemed to me as if two soft substances were rubbed very slightly—the one over the other. It is well to remark that the movement by lateral displacement of these segments was very much limited indeed, and I should think that I moved the outer edge of the epiphysis perhaps one-quarter or one-

sixth of an inch beyond the corresponding edge of the shaft. At the same time, it was clearly perceptible to me that very considerable bending could be produced here, and that such a motion was very readily induced; but owing to the extreme suffering of the child I did not push the examination further. My reflection, after examining this case, was to the effect that in it the lateral forced displacement was quite limited, much less so than that which I observed some years previously in the preceding case; and that flexion was the principal motion obtainable, and that perhaps cases may be observed in which the former motion may not be obtained, while the latter can be clearly performed. My explanation was that the intervening cartilage between the epiphyses and the diaphyses had not been to a very great extent destroyed, and that as a result the motion was limited. When the epiphysal region was carefully drawn outwards, the leg being held in a normal position, it was readily seen that the normal axes of the bones were restored. Upon examination of the other portions of the osseous system, every bone was thought to be normal except the distal end of the left radius and ulna, the epiphyses of which, just as they merged from the diaphyses, were found to be very slightly enlarged, the difference in circumference between the corresponding parts—left and right—being about one-third of an inch. Besides these osseous lesions, the whole integumentary surface was the seat of a roseolous and papular syphilide. The internal treatment consisted in five-drop doses of the mixture already spoken of. The leg was placed in its normal condition, and its malleolar extremity was carefully but firmly bandaged with strips of adhesive plaster, an opening being left over the sinus. The child remained under treatment for a month, in which time much improvement was produced in the osseous affection, so that there was very little, if any, tendency to abnormal flexion; and there was an evident soldering together of the detached segments. The cutaneous syphilides were improved. The child was not brought again to the college, as its mother regarded it as cured. I have just learned that it was suddenly attacked with an affection of the brain, of which it very soon died, and which was called by the family attendant acute hydrocephalus. It is very probable that if the mother had continued her visits to the clinic regularly, and had faithfully



followed our treatment, which would have been gradually increased in strength, that her child would not have succumbed to the pachy-meningitis, of which undoubtedly it died, and which, to my mind, was of syphilitic origin. I was informed by the mother that the family physician did not regard the osseous lesions as being induced by syphilis. An interesting point in this case is the comparative immunity from inflammation which the integument presented, even though the seat of a copious syphilitic eruption. Without any treatment except pressure the sinus closed, and a very minute cicatrix was left. It is a noticeable fact, and one of diagnostic import, that such grave changes should take place in a limb, and that so little, if any, constitutional reaction should be induced. This point will be brought out again further on.

CASE XII.—Through the kindness of Dr. H. T. Hanks, I had the opportunity in May, 1871, of observing a very interesting case of enlargement of several of the phalanges of the fingers. The patient was a child ten weeks old, born of a mother, who, upon examination, I found to have been infected with syphilis within a year. This child had enlargements of the first phalanges of the index and ring fingers of the right hand, and of the same phalanx index finger of the left hand. The lesions of these bones had been noticed when the child was a little more than a month old. The swellings consisted in a general enlargement to about three times the normal diameter of the phalanges; and they caused considerable tension of the integument, and in one finger much hyperemia was observed. The swelled ring-finger displaced the fingers on each side very much, while the two enlarged indices were turned inwards, but did not push very much out of its line of direction the middle finger on either side. The affected fingers were very much flexed, and at their base being thick and bulbous, they gradually tapered off towards the ungual extremity in such a manner as to lead to the impression that the second phalanges were also enlarged. Careful manipulation and deep pressure showed very conclusively that these bones were unaffected. The swellings were alike observable on the palmar and dorsal surfaces; and though they rendered the fingers unwieldy, they could be flexed and extended very considerably by a second person. It

seemed evident to my mind at the time, that, unless treatment was early instituted, ulceration of the integument was inevitable in one finger. The lesion was due to stasis from pressure within, and not to gummy deposit. This case was sent to the College of Physicians and Surgeons, and, at Dr. Draper's request (he being unavoidably absent), I made it the subject of a clinical lecture. I saw the child but once.

### III.—RESUMÉ OF CASES OF THE VARIOUS OBSERVERS.

M. Roger<sup>1</sup> observed a case of acquired infantile syphilis, in a child two years old, who besides having syphilitic lesions of the skin and mucous membranes, presented enlargements of the inferior extremity and internal borders of both humeri, enlargement of the anterior surface of the head of the tibia, and nodes on the frontal bone. This is one of the very few recorded cases of the development of osseous lesion in the early stage of acquired syphilis of a young child. It may be classed with my case No. 8. It is to be regretted that the date of contagion is not given, as from it we could have ascertained the date of apparition of the bone trouble. The case also is wanting in the detail of treatment, course and result.

Dr. T. Curtis Smith<sup>2</sup> reports the case of a child, born of syphilitic parents, upon whom when three weeks old various syphilitic lesions appeared. When first seen by Dr. Smith it was six weeks old, and he found that the first phalanx of the index, middle, and ring fingers of one hand were much enlarged. The swelling of the bones was greatest at the joints, which, however, were not involved, and from there it tapered off rapidly towards the next joint, which was also normal. The integument was livid. The joints were not freely movable. The fingers were evidently the seat of mild spontaneous pain, but gentle manipulation could be practised. Under a mercurial treatment the enlarged bones were reduced to their normal size in three and a half months. Both parents were syphilitic, the husband having contracted the disease two years before and having been improperly treated, the mother being contaminated shortly after and not being treated until after the birth of the child.

<sup>1</sup> *L'Union Médicale*, page 249. Paris, 1865.

<sup>2</sup> A Case of Congenital Dactylitis Syphilitica. *American Journal of Syphilology and Dermatology*, Jan., 1872, page 33.

Fournier's<sup>1</sup> cases are as follows :

An infant, three months old, having papular syphilides, mucous patches, and coryza, had a swelling of the lower end of the right humerus, which was greatest at its internal border.

Case second : a child, three months old, having a pustular and papular syphilide and coryza, had an enlargement of the upper portions of the radius and ulna. The ulna was double its size at its upper fourth, and the head of the radius was as large as a nut.

Bertin,<sup>2</sup> in his treatise, says that he has seen cases of periostitis and exostoses in syphilitic children, and then reports the following :

Pierre S., thirty-six days old, was brought to the Maternity Hospital, on the first of January, 1809, having blemmorrhagic ophthalmia and pustules and tubercles of the whole body, and a tumor of the size of a pigeon's egg over the left great trochanter, and a periostitis of considerable extent upon the upper and posterior portion of the ulna. The movements of the arm were impaired, and there was redness of the skin over the tumor, and pain existed. The bone lesions and cutaneous rashes disappeared under a mercurial course alone, in five months.

Archambault<sup>3</sup> of Paris, reported a case of an infant, whose mother had tertiary syphilis, and who had mucous patches and an enlargement of the last phalanges of the fingers. Being at first regarded as false spina ventosa, it was unsuccessfully treated with anto-strumous remedies ; but when mercury was given the mucous patches soon disappeared, and the bones were reduced to their normal size.

Bärensprung's<sup>4</sup> case was that of a child, born of a syphilitic mother, who, having had tubercles which underwent ulceration on various parts of the body, especially on the head, died of exhaustion when four months old. At the autopsy the left parietal bone was found to be the seat of considerable necrosis, the morbid processes having involved the periosteum and the

<sup>1</sup> *L'Union Médicale*, page 540. Paris, 1865.

<sup>2</sup> *Traité de la Maladie Vénérienne chez les enfants nouveau nés, les femmes enceintes et les nourrices.* Paris, 1810. Page 361.

<sup>3</sup> *L'Union Médicale*, No. 140, 1869, and *American Journal of Syphilography and Dermatology*, Jan. 1871, page 14.

<sup>4</sup> *Die hereditäre syphilis*, pages 126-7, 8. Berlin, 1864.

outer lamella of bone. The case is very badly reported, but well illustrated by chromo-lithography.

The same observer speaks of a case in which changes in the bones were observed at the junction of the shaft with the epiphysis at the lower end of the right and at the upper end of the left femora.

In a third<sup>1</sup> case mentioned, a swelling was found upon the sternal end of the clavicle in a child three weeks old.

Putegnat<sup>2</sup> reports a case of a child, the subject of hereditary syphilis from a half month old, who had a swelling of the upper part of the right thigh, which was followed by an abscess and dislocation of the femur. The bone-lesion was considered by the observer as an instance of the development of rickets in a syphilitic subject. This author also says he has seen a cranial exostosis on a syphilitic infant.

Bulkley's<sup>3</sup> cases are two in number, and through his kindness I have had ample opportunities for observation of them, and I quote them nearly in full:

CASE I.—A rather delicate girl; was first seen when two years and nine months old. Though the early history of syphilis is not clearly made out, the existence of traces of an early interstitial peratitis and the peculiar bone-lesions point to that disease as being undoubtedly their true origin. When fifteen months old, a swelling began on the top of the left ankle, which softened and opened in two months. A similar swelling appeared, two months later, on the outer side of right foot, and it softened and opened in two months. About the same time—that is, when the child was fifteen months old—the first phalanges of the thumb and index finger of the left hand swelled, and shortly after softened and opened. When the child was a year and nine months old, the right metacarpal bone of the index finger swelled and opened. The pain was so severe in the affected parts that the child's rest was disturbed. When first seen by Bulkley, the child was two years and nine months old; consequently some of the bone-lesions had existed

<sup>1</sup> *Ibid.*, page 192.

<sup>2</sup> Histoire et thérapeutique de la syphilis des nouveau nés et des enfants à la mamelle. Paris, 1854.

<sup>3</sup> Rare Cases of Congenital Syphilis. *New York Medical Journal*, May, 1874.

eighteen months—the others a year. The affected phalanx of the left forefinger measured two and five-eighth inches—its fellow of the right hand measuring one and a half inches. The circumference of the first phalanx of the left thumb measured two and three-eighth inches—its analogue measuring about one and five-eighth inches. The swellings were greatest at the affected phalanges, and tapered off to the ends of the fingers. The joints were unaffected. There was an ulcer over each phalanx which extended down to the bone, and a discharge came from each. Upon the right hand there was an ulcer over the middle of the second metacarpal bone, which was swollen in its whole length. The whole of the left foot was moderately swollen, but it was evident that the fourth and fifth metatarsal bones were enlarged. Over these bones was an excavated ulcer, and around it an infiltration and redness of the integument. Upon the outer malleolus there was an excavated ulcer, and upon the middle of the leg a scar of a former ulceration. The following mixture was ordered:  $\mathcal{R}$  hyd. bichlor. gr. ss., pot. iod.  $\mathfrak{z}$  i, ferri ammon. cit.  $\mathfrak{z}$  ss, syr. pruni  $\mathfrak{z}$  iv; dose, one teaspoonful three times a day. Simple cerate was ordered for the ulcers. Under this treatment much improvement was observed in a month, as the ulcers on the feet were healed. There was also no discharge from the finger or thumb. The swellings remained the same. In a fortnight after, although a marked improvement of the general health had taken place, it was noticed that the swellings on the thumb and forefinger were slightly increased in size. From the 28th of April, 1873, the treatment was very irregularly followed, and during the greater part of the time neglected; but in January, 1874, a slight diminution in the size of the affected bones was found. There was a marked distortion observed in the thumb; it was, though thickened, shorter than normal, and bent inwards towards the forefinger, which was slightly flexed. The metacarpal bones were enlarged. All of the bone-swellings seemed indolent.

The second case was that of a child of a mother in the second year of her syphilis. Shortly after birth it developed well-marked syphilitic lesions, and at the same time a swelling was noticed in the first phalanx of the thumb; the bone was enlarged to fully twice its natural size. The case was seen by Bulkley when a month old, and was placed upon treatment.

The swelling gradually subsided, and in seven months was no longer noticeable, but it was observed that the affected phalanx was about one-twelfth of an inch shorter than its fellow, consequently the thumb was shortened. As there was nothing abnormal in its shape, it is probable that the shortening is due to an arrest in development during the existence of the lesion.

Mr. John Morgan<sup>1</sup> mentions the case of a child three years old, whose history of hereditary syphilis was clear, who had a very large swelling of the metacarpal bone of the thumb, which was perfectly globular in shape, and presented the appearance as if the thumb had been thrust through a ball of tightly stretched skin. Suppuration occurred, leaving a thickened condition of the parts. The case is rendered almost valueless by the fact that the date of invasion and history of the course of the lesion is not given. The case is similar to my eighth case. The same observer<sup>2</sup> presented casts of several specimens of what he regarded as dactylitis syphilitica to the Dublin Obstetrical Society, but the descriptions given are so vague and meagre that the cases are worthless for scientific purposes. In the discussion upon them the author's diagnosis was called into question.

Ranvier's<sup>3</sup> case was related before the Society of Biology in June, 1864.

D. Z., a seamstress, eighteen year of age, of lymphatic temperament and delicate constitution, was admitted to Lourcine Hospital, service of M. Simonet, January 19, 1864. She is pregnant six months. Has mucous patches on vulva and anus, adenopathies, roseola and angina. She was not treated other than by local applications. On the 16th of March she was delivered of a child in her eighth month of pregnancy. The child was thin, but did not present any signs of syphilis. The mother nursed it, and neither received treatment. On the 10th of April an ulcer was found upon the left olecranon, which was two-fifths of an inch in diameter, having a sloughy gray base, and edges thick, sharply cut and undermined. The Sisters of Charity stated that a week after its birth they noticed a tumor, which was regarded as a furuncle, and which opened and

<sup>1</sup> *Practical Lessons in the Contagious Diseases*, page 235. London, 1872.

<sup>2</sup> *Dublin Medical Journal*, April, 1873, page 354 et seq.

<sup>3</sup> *Gazette Médicale de Paris*, vol. xix., third series, page 596. 1864.

formed this ulcer, which was considered by MM. Verneuil and Simonet as a degenerated gumma. There was a slight papular syphilide of the body. It became emaciated and died on the 13th of April.

*Autopsy.*—Liver tolerably yellow, augmented in volume, two small pale tumors on under surface, one on the upper. The substance of the liver was hardened, and minute points were seen, which consisted of connective tissue and young cells. This same condition was observed around the various vessels and ducts. Other organs not markedly altered.

*Condition of the Bones.*—All the epiphyses are separated from the diaphyses, or so slightly adherent that the mildest traction separates them. On a longitudinal section corresponding to the long axis of the bone, the following points are observed: The proliferation of cartilage is perfectly normal in the portion called by M. Broca *couche chondroïde*. The cartilage-cells are spread out as usual in the osseous areolas or spaces. But ossification is tardy, and it is only one-fifth of an inch beyond the limit of apparent ossification that we find osseous cells, whilst normally they are found at the most one millimetre from this line. The author alludes to the fact that if treatment is adopted the child is either cured or ameliorated, while if not treated, syphilis runs its course. He thinks that this observation supports the view that pregnancy retards the evolution of syphilis in the mother, and that after that process it breaks out again.

Bargioni's<sup>1</sup> case occurred in the service of Professor E. Pellizzari, in the hospital of Santa Maria Nuova, in Florence. At the time it was under observation it attracted considerable attention and discussion, from the fact that it was said to be an instance in which syphilis was communicated together with small-pox in the process of gestation. The reasons for the suspicions of the latter disease were, that it was raging in the part of the country in which its mother lived, and that four papules on its buttocks resembled those of variola. Its mother had variola some years before. The truth seems to be clear to me, from a perusal of the case, that it was simply one of hereditary

<sup>1</sup> Ascesso articolare e gomme delle ossa e dei polmoni in neonato affetto da syphilide con eruzioni vajalosa congenita. *Lo Sperimentale*, page 65, tom. xiv. July, 1864.

syphilis, and that some of its pustules resembled those of variola,—a feature sometimes observed even in acquired syphilis. The mother was not discovered to be syphilitic, but she stated that the child's father had syphilis before their marriage. The lesions on the integument of the child were unmistakably syphilitic. They consisted of pustules and bullæ, well marked on palms, and soles, and onychia; the mucous membranes were also affected, there being a mucous patch in the mouth, and the child suffered severely from snuffles. Its facies was of the peculiar senile expression of syphilitic children. The child gradually became weak, refused food, became emaciated, and died when twenty-two days old.

The autopsy was made thirty-two hours after death. In the head a yellowish mass was found between the dura mater and frontal bone. Under the microscope, it was found to consist of degenerated fat, pus-cells, and of connective tissue. In the lower portion of each lung little masses of induration were present.

*Ossæous System.*—In the right elbow-joint was a quantity of thick yellow pus; the cartilages were eroded and articular surfaces partly denuded. In the long bones, at the junction of the epiphysis and diaphysis, a mass of yellow, grumous matter is seen, and the parts are very easily separated. This material was infiltrated into the substance of the shaft of the bone, and it contained small portions of necrosed bone. The microscope showed this matter to consist of pus-cells and fatty detritus, whilst in other parts nucleated fusiform cells were found in the granular matrix.

VALEIX'S CASE.<sup>1</sup>—A female foundling, born September 5th, 1834, was found to have, on the 14th of the same month, a few small pustules, containing a drop of white pus, and surrounded by tolerably red areola. On the 15th, when the child was ten days old, it was observed that it could not move its right arm—that it cried if it was moved, and presented an anxious appearance of countenance. On the 26th, the child being three weeks old, a tumor in which fluctuation was distinctly felt, which occupied and entirely surrounded the right radius, was

<sup>1</sup> *Bulletin de la Société d'Anatomie*, tome ix., page 169. Paris, 1834.



discovered. Examination was painful, and the child kept the hands and fingers semi-flexed. The next day a similar painful and fluctuating tumor appeared upon the upper third of the left humerus, which apparently involved the joint, and in elevating the deltoid caused a considerable projection of the shoulder. Pain was present and an inability to move the limbs. The child cried if they were moved. When twenty-three days old, it died of diarrhœa and exhaustion.

*Autopsy.*—The tumor at the shoulder, which had displaced vessels, nerves, the deltoid, and other muscles, contained about an ounce of thin, inodorous pus, which was contained in a cavity formed on each end by the detached surfaces of the epiphysis, and of the diaphysis of the humerus, while the lateral walls were composed of the periosteum, which was transparent and adherent to the surrounding connective tissue. The ends of the epiphysis and diaphysis presented a red and roughened appearance, and were bathed with the pus of the cavity. At the end of the shaft spongy bone-tissue was seen. The periosteum was normal in its relations elsewhere on the shaft, and just above the deltoid it was in contact with a slightly elevated portion of bone of irregular, spongy appearance.

At the wrist there was also a tumor, which contained pus. The epiphysal portion of the radius was separated from the shaft and also from the interosseous ligament, and its periosteum was detached. At the point on the shaft where the periosteum became detached a new formation of bone was found, which encircled the radius like a sheath, and was adherent to the periosteum, and reached to the head of the bone. At this portion the periosteum was thickened and shining, but readily detached from the bone with slight force. When the membrane was removed the new bony tissue was found to consist of longitudinal fibres, and was, when pressed, hard, heavy and friable, and its interstices contained a yellow fluid. It rested upon healthy bone. The inferior portion of the ulna was normal, as was the wrist-joint also.

The right tibia was also involved, its two epiphyses being separated, an abscess being present at each end of the bone. There was also a similar sheath of bone, as in the radius, extending between both ends, where it terminated by a considerable increased thickening. In the left leg a precisely similar

condition was discovered at the upper end. At the lower end there was no abscess, the periosteum was firmly adherent and normal. The epiphysis was not separated, but it was readily disunited by slight traction, and the two surfaces were rough, dry, and of a deep-red color. The pus escaping from the abscesses of the leg was thick and of the color of wine-dregs. Similar lesions were found in the right knee, in the sacrum and ossa ischii. Depaul's induration of the lungs was also found.

PARROT'S CASES.<sup>1</sup>—Case first had been observed by M. Gueniot, who had published its history. A child, of very delicate build, had a gangrenous ulceration of the right groin and an ulceration of the umbilicus. It seemed to be paralyzed in all of its limbs, and if they were elevated they fell heavily down. The forearms were pronated. Below each knee it was noticed that there was a separation of the shafts of both tibia and fibula from the superior epiphysis, and that a lateral motion could be made. The cutaneous sensibility was lessened. It died when twenty-five days old. At the autopsy all the bones of the body, excepting the upper end of both radii and ulnæ, were the seat of inflammation. The lesion consisted of a well-pronounced injection and ecchymosis of the bone-tissue, near the epiphysis, and between the two tissues was a layer of thick greenish pus. The bone lesion was confined to the portion nearest the epiphysis, and was not deeply involved. Periosteum was thickened, red, and adherent, but readily separated. When the pus was removed crepitation could be produced. The joints were not involved. Pus was found under the capsule of the liver and under the pleura. At the time of observation, Gueniot did not attribute the lesions to syphilis, but later Parrot suggested that disease as their cause. It is to be regretted that the history of the parents was not obtained, but the case is accepted by Parrot as one of syphilis.

The second case was that of a child, twelve days old. The history of its parents was not obtained. It was quite weak. It was noticed that its forearms were markedly pronated, and that when any of the limbs were elevated they would, if al-

<sup>1</sup> Sur une Pseudo-paralysie causée par une alteration du Système osseux chez les nouveau nés atteints de Syphilis héréditaire, par M. J. Parrot. *Archives de Physiologie Normale et Pathologique*. Quatrième Année. No. 3, 4 et 5. Paris, 1872.

lowed, fall heavily down. There was very little movement in the limbs, but some slight motion of the fingers. It died when a month old. At the autopsy an induration of lungs was found, as well as an increase of the connective tissue of the liver. The whole osseous system was said to be involved, the lesion being at the junction of the epiphyses and diaphyses. The first phalanx of the right middle finger, as well as the inferior extremity of the fourth metacarpal bone, were found to be involved, as were also the pelvic bones, the scapula, the axis, and the ribs at their junction with the cartilage of the sternum. This case is also accepted by Parrot as syphilitic.

CASE III.—A child, about two months old when first seen, had a syphilitic eruption on its body. The right arm seemed normal, but the left hung by the side of the body. Upon pinching the skin very limited motion was produced. The legs were very thin, and, if pinched, their segments moved after the manner of a wooden toy-man. There was scarcely any spontaneous motion. There was an abnormal cardiac bruit heard. The child died when a little more than a month old. Pulmonary hepatization and vegetations on the valves of the heart were found. Nearly every bone was altered. The cranial bones were much altered. The coronoid process of the right inferior maxillary was thickened, and at its symphysis there was a thickening and softening. The ribs were involved. The point of ossification of the head of the right humerus was yellow, and at its internal and inferior extremity was an exostosis, the tissue of which was more compact at its periphery than near the primitive bone. The shoulder-joint contained a greenish-yellow liquid, which resembled pus, and its capsular ligament was loosened and permitted excessive motion. The upper part of the ulna was thickened by a superimposed bony layer, thick superiorly and becoming thin and emerging into the shaft inferiorly, and again becoming progressively thick towards the inferior epiphysis, being developed upon the external part of the bone. A similar condition was found upon the right iliac. The two epiphyses of the little trochanters were movable, and the spongy tissue was altered. The upper epiphysis of the regat tibia was mobile upon the diaphysis. At the lower epiphysis the lesion was less pronounced. The lesion was found to vary in intensity in the

various bones; it was well marked upon the metacarpal and metatarsal bones and the phalanges. The calcaneum, astragalus and the vertebrae appeared normal. The left scapula was involved at the neck.

CASE IV.—Child, syphilitic mother, having ulcers on thighs and buccal *mucosae*; died when a month old. When periosteum was detached from long bones, new bony tissue was found near epiphyses. Changes were noticed at the ossifying portions of diaphyses. Ribs were affected.

CASE V.—A child, having ulceration of both corneae and ulcers about the head and in the mouth; lived to be a month old. At the autopsy the shaft of the femur was found to be altered at both ends. The superior extremity of the humerus was markedly involved, and so was the superior extremity of the tibia. The upper end of the ulna was involved, but the lower end was normal. The radius was slightly altered, as were also the sternum astragalus and calcaneum. The clavicles were affected at their internal ends, and so were the ribs near the cartilages.

CASE VI.—A child, having extensive cutaneous lesions; died, when about ten weeks old, from diarrhoea and exhaustion. The right femur was found to be altered. At the upper epiphysis was an increase of the chondroid layers. At the lower end of the bone the epiphysis was separated from the shaft by a gelatinous substance, upon the removal of which a space was left between the two segments of the bone. The tibia was involved at its upper portion more markedly internally than externally, and at its lower internal portion an exostosis existed.

CASE VII.—A still-born child. The spongy tissue of the long bones was red at the middle of the shafts and violaceous near the epiphyses. There was an alteration of the distal ossifying layer of the left femur, and the epiphysis was readily broken from the diaphysis. The same condition was found at the upper end of this bone, and also in the tibia and humerus, radius, metacarpal bones and ribs.

CASE VIII.—A still-born child. Tibia and fibula, humerus and ulna, were involved.

Wegner's cases,<sup>1</sup> twelve in number, were those of children either still-born or who died a few days after birth; one only lived a month. Their chief interest is in the pathological conditions observed in them, though they also furnish statistics for clinical deductions.

1. Syphilitic child, with extensive visceral and cutaneous lesions. The diaphyses of the long bones, including ribs, were the seat of periostitis, and at their junction with the epiphyses there was softening of the tissue and separation of the parts.

2. Still-born child at seven months, having visceral lesions; on the line of ossification brittle chalky swellings.

3. Child having severe visceral lesions; gummy periostitis on frontal bone; softening and separation; at the junction of diaphyses with epiphyses, crepitation observed; ribs much affected.

4. Child, which lived three hours, having pemphigus and visceral lesions; periostitis of long bones, irregular chalky zones at the line of ossification.

5. Child, which lived four weeks; lesions of ocular tissues; small fluctuating abscess on right parietal bone; irregular line of ossification infiltrated with chalky masses; developing fatty degeneration of marrow of bones.

6. Child of mother having severe secondary lesions: periostitis of long bones; at epiphyses irregularity of ossifying process, same on ribs; visceral lesions.

7. Child of mother in second year of syphilis; cutaneous and visceral lesions; at all of the epiphyses of long bones and on ribs diffuse irregularity of spongy layers.

8. Child of mother two years syphilitic; lived six days; on epiphyses of long bones and ribs extensive alterations.

9. Child which died soon after birth; cutaneous and visceral lesions; at the epiphyses of long bones and on the end of ribs diffused chalky infiltration.

10. Child of mother early in syphilis; visceral lesions; partial separation of epiphyses of some long bones, and changes in same situation in others.

11. Child of mother a year syphilitic; visceral lesions; bone

<sup>1</sup> Ueber hereditäre Knoockensyphilis bei jungen Kindern. Archiv für pathologische Anatomie und Physiologie und für klinische Medicin. Band 50, Heft 3, pages 305 et. seq. Berlin, 1870.

lesions in first degree on long bones and ribs; fatty degeneration of marrow.

12. Child which died shortly after birth; visceral lesions; on long bones which are in first and second degree; partial fatty degeneration of medulla.

Waldeyer and Köbner's<sup>1</sup> cases are also twelve in number. In each case the child succumbed from the severity of its syphilitic lesions, consequently the deductions which can be drawn from their study are chiefly in relation to their pathology. Certain points of clinical interest can also be deduced.

1. Child, born of a woman affected for two years with syphilis; had cutaneous and visceral lesions, and syphilitic changes at the epiphyses of both tibiæ and at the end of ribs.

2. Child, having extensive visceral lesions; had syphilitic affection of ribs, tibiæ, and bones of feet. Mother was regarded as syphilitic.

3. Child of a mother in the early stage of syphilis, having three pustules on the sole of one foot and one on the other; was born probably one week prematurely, and died when nearly a month old. During life an extraordinary flexibility of both hands was noticed. At the autopsy extensive visceral lesions were found, and that the epiphyses of both humeri and of the two bones of the forearm were separated from their diaphyses. Between the two separated portions a reddish matter was observed.

4. Case in which epiphyses were separated from the diaphyses.

5. Case showing changes in the second stage.

6. Case of child five weeks old, mother having a papular syphilide; visceral lesions, alterations at the epiphyses of tibiæ; other bones not examined.

7. Case in which changes of second degree were found at the epiphyses of the long bones.

8. Case in which the epiphyses were affected in the second degree.

9. Bone changes at the epiphyses.

10. Case of a boy who died when three months old, who had papular and pustular syphilides. At the autopsy macroscopic

<sup>1</sup> Beiträge zur Kenntniss der hereditären Knochensyphilis. Band 55, Heft 3 und 4, pages 367 et seq. Berlin, 1872.

changes were noted at the borders of the epiphyses, which were verified by microscopic examination.

11. Child of syphilitic parents; contagion probably five or six years previous to birth of child. Diffuse syphilitic changes were noted at the epiphyses.

12. Child, whose mother did not present any lesions of syphilis, but whose father had been syphilitic three years. Changes at the ends of ribs, also at the epiphyses of the radius, ulna, and humerus.

#### IV.—GENERAL CONSIDERATIONS AND DIVISION OF THE SUBJECT.

We are warranted now in assuming that these series of cases and the details thus given include the bulk, if not all, of our present knowledge of the clinical features of bone-syphilis in infants and children. It becomes necessary, then, to study carefully the points and facts offered by this array of cases, and to deduce from them, if possible, true conclusions as to the clinical history, diagnosis, prognosis, and treatment of these lesions. In the résumé of cases I omitted the pathological details given by the various observers, but I shall fully include them in a subsequent portion of the work.

It will have been seen already that certain striking and frequently-occurring changes are observed to be seated at the junction of the epiphyses with the diaphyses of long bones, and that in addition, though somewhat less frequent, noticeable changes are found upon the flat, irregular, and small bones. We shall then study these changes in the order in which they are most frequent, as that method will tend towards a more correct presentation of the whole subject, and as it is, in fact, rendered necessary by the varying features presented by the lesions in these different classes of bones. In this connection it is essential to recall to mind, in a general way, the condition of the bones at the early periods of life, and also to indicate in a concise manner the pathological changes which they may undergo, reserving a minute description of their pathology to a subsequent portion of the paper. It will be remembered that in the young subject the bones are constantly undergoing active developmental changes, and that the majority of them, in the early years of life, are in an unfinished state, and are then, in

the case of the long bones, formed of a shaft or diaphysis, composed of bone-tissue, constantly augmenting by increase, and of certain smaller portions, situated at each end, and continuous by an intermediate layer of cartilage, which are called epiphyses. Later on these parts fuse into one, then constituting a perfect bone. In the irregular bones the process is similar, except that a body or main portion exists instead of a shaft, but the relation between it and the epiphysis is precisely the same. In the long bones the increase in diameter is effected mainly by a laminar deposit from the periosteum, their medullary canal being formed in exact proportion to the growth of the shafts; while the increase in length is due to a development of the ends of the diaphyses towards the epiphyses. The latter segments at this time are separated from the former by a layer of cartilage, of which tissue they themselves are composed. Then as the requirements of the skeleton demand, varying in point of time in the different bones, ossification begins in the epiphysis, extending toward the diaphyses, and there being met with a similar process which has been taking place in that portion of the bone during its whole existence. Thus it will be seen that at this situation very active changes are constantly going on. In the flat bones we find two modes of increase: first, the development of the bone proper from its primary membranous condition, and second, by the deposit of layers of bone from the investing periosteum. In the small bones, also, we find the processes of development are quite active, and that at varying times ossification begins in their substance, which is primarily wholly cartilaginous, and that they gradually alter in structure while they increase in size. Considering, then, the activity and extent of these morphological changes, it is not surprising that under the influence of syphilis, which so powerfully complicates and modifies normal processes, the nutrition and increase of bones should be materially influenced. Thus pathological studies are simplified by our knowledge of physiology and normal anatomy. So that, applying the united knowledge in this case, we can readily understand that in a given syphilitic child, upon whose bones at the diaphyso-epiphysal junction we find noticeable enlargements, there is there a perversion or interference with the normal course of the development of the bone; and also, that when we find a small bone enlarged, or even the sub-



ject of more active and degenerative changes, or that a flat bone is studded with perceptible elevations, we can, in the light of our knowledge, suppose that certain pathological changes, perhaps induced by syphilis, have been engrafted upon the physiological. Then, again, when we pursue the subject further, and endeavor to ascertain by microscopic and macroscopic examination what these changes really are, our suspicions are fully confirmed by the appearances which are observed. In speaking of the swellings I shall, throughout the descriptive part of the work, merely allude to them as being due to increased cell proliferation in varying proportions, as this method will be simple in not presenting pathological details in advance, and in avoiding troublesome repetitions.

Commencing, then, according to the plan already laid out, with the study of the lesions upon the long bones, it must be remembered in advance that similar or somewhat dissimilar changes in the other kinds of bones may or may not be co-existent with them. There are cases in which the long bones alone are involved; others again in which they and the other varieties of bones are affected together; and others still in which the lesions are developed on the small or on the irregular bones while the long ones escape.

A careful perusal of those of my cases in which these long bones are altered, shows clearly that they may be divided into two stages, or even classes: a first, in which the morbid processes, as evidenced by swellings, undergo resolution without perceptible impairment of the structure of the bones, of the parts around and above them, or of the function of the member of which they form a part; and a second, in which resolution does not take place, but in which degenerative changes are observed. These degenerative changes may be limited simply to a destruction of the superficial portions of the swellings in greater or less extent, or they may be so severe as to involve the whole diameter of the swelling in destruction or liquefaction, in which event the epiphyses become separated from the diaphyses. A casual knowledge of this subject might lead to the impression that these cases are essentially different in kind, but, as I shall show further on, such an opinion is erroneous, as they are really representations of well-defined stages of development of one and the same morbid process. The swell-

ings on the other bones may also be divided into similar varieties. Pathological facts, as brought out by the observations of Wegner, Waldeyer, Köbner, and Parrot, show that this clinical division is the true one. The seat of the enlargements or swellings on the long bones is, for anatomical reasons, always at the junction of a diaphysis with its epiphysis, and, as my cases show, they are as thus far met with in clinical practice, developed rather more frequently at the distal end of the bone than at the proximal end, though the reverse may be and has, as we shall see, been quite frequently found. When examined, the swellings are found to present quite well-marked characteristics. We shall study them in their order as just laid out, taking into consideration the degenerative conditions, after we have fully studied the first or resolute variety.

#### V.—DESCRIPTION OF THE OSSEOUS LESIONS UPON THE UPPER EXTREMITIES.

In our study of the lesions of the long bones we naturally begin with those which are observed upon the upper extremities. In the main the swellings at the junction of the diaphyses of the long bones with their epiphyses present many points of resemblance; therefore, though the description which immediately follows applies to the enlargements at the distal ends of the radius and ulna, the general features indicated are such as will apply with slight modifications to similar swellings elsewhere located, though of course we shall study them all separately. If now we trace, with the tips of the fingers, the continuities of the bones downward along their shafts, we encounter just at or before the commencement of the epiphyses a quite abrupt elevation, which is found to encircle the bone or perhaps bones. Usually this swelling can be felt on all of the surfaces except that which is in coaptation with its companion bone. The surface of this swelling is generally smooth, but it may be slightly undulating, not, however, ridgy. It is gently rounded off at its peripheral portion, where it may end by simply enlarging that part of the bone which corresponds to the ossifying layer between the shaft and the epiphysis, or it may extend further down and merge gradually into an expanded epiphysis. In the latter case the surface of the tumor is rounded at its proximal and flattened towards its

distal end. In the first case, in which only a limited portion of the shaft and of the epiphysis is involved, the swelling, which is usually from three-quarters to perhaps an inch and a quarter, can be traced as a ring encircling the whole bone, and then the epiphysis beyond it is felt to be normal. In the other case a general enlargement is observed, though the fact may be noted that, though the epiphysis is enlarged, the bulk of the swelling is at its upper and middle parts, and the epiphysis does not seem out of proportion when it is examined just at and from the wrist-joint, with the function of which it produces usually no impairment. The conclusion, then, is obvious that in the cases thus far observed, the enlargement of the bone has been confined to the end of the shaft, and perhaps the proximal half or two-thirds of the epiphysis, and does not militate at all against the supposition that in some cases the whole epiphysis may undergo great enlargement. The existence of this condition can be determined by future observation.

Such, then, is a comprehensive description of the shape and features of the individual swellings of the bones themselves, and of course applies to those of this situation. When the swellings on the two bones are examined together it will be found that there appears to be a direct fusion of the two epiphyses. This can be readily appreciated on a very thin child, but can also be determined, even if the arm is fat, by tracing with the tip of the finger, along the back part of the limb, the course of the interosseous space, which can be clearly made out until we reach the epiphysal region, where the finger meets with a seemingly continuous tissue, so that the usually well-defined furrow between the two epiphyses can no longer be distinguished. This condition is undoubtedly due to the great cell proliferation, which appears to have gone on here to such an extent that the bones feel as if soldered together. There is not, however, or rather the symptom has not as yet been observed, any impairment in pronation or supination of the limbs. Such are the points elicited by manipulative examination of the swellings. If now the limb is examined by the eye, the swellings of the bones may or may not be visible. Thus, in a child who has considerable development of adipose tissues, the enlargements of the bones of the forearms may wholly escape

the observation of its attendant, and, in fact, the child may come to the surgeon for treatment of other symptoms or lesions, and the swellings may even pass unnoticed by him unless search is made for them. Thus in my second case the child was brought for other syphilitic lesions, and when examined carefully the swellings were found and were clearly demonstrated to the class. In my third case the child's mother thought that perhaps its bones were swollen, but she was not certain. In fact, I suspect strongly that, particularly among the lower classes, such swellings might even be recognized and then not be regarded as abnormal, and also that they often wholly escape notice. In those children whose fatty tissue is abundant there is no evident stretching of the integument by the pressure within. When, however, we examine a more or less thin child, upon whose forearms these swellings are seated, we can distinctly observe quite large rounded elevations of the integument, which can be clearly made out either by a lateral or vertical view of the limb, and they are of such a character as to attract the attention. This fact was well observed in my first case. The swelling is seated just above or may appear even as if reaching very near to the wrist-joint, and it involves the whole breadth of the limb. It begins by a gradual uplifting of the integument, attains a height of perhaps three-quarters of an inch—in some cases more, in others less—then having a longitudinal area of an inch, more or less, subsides by gradually rounding off at or above the joint. The integument in cases which undergo resolution is of course stretched to a greater or less degree. It can be moved over the bony tumor with ease, and according to my observation has never been altered in color. The appearance is somewhat like that of a dislocation, and is identical with the double joint of rickets.

The description which has been given is applicable to those cases in which both bones of the forearm are enlarged in the region of the carpal epiphyses. This brings us to a consideration of the point as to whether the swellings always involve both bones, and if so, whether the swellings are always symmetrically developed on both forearms. In the post-mortem cases, examined by Wegner and Waldeyer and Köbner, it was found by these observers that the lesion was always symmetrical in both bones and on both arms, but the results of clinical obser-

vation, as drawn from twelve of my cases, show that in practice this fact is not borne out.<sup>1</sup> Thus, in these twelve cases, both bones were symmetrically involved in both forearms in seven; in two the right radius only was affected, in one the radius and ulna of one side only were swollen, and in two the bones of the forearm and in fact all of the long bones of the body escaped. The symmetrical development of the swelling on both bones of both forearms is the rule, and the unsymmetrical development is the exception, according to our present statistics, but further observation may modify this statement. The description of the swellings, as given when two bones are affected, fully applies to those involving only one bone, except, of course, that the latter are limited to one or other side of the limb instead of involving its whole breadth. The appearances to the eye are varied in the same manner.

Such, then, being the clinical features of the swellings on the distal ends of the radius and ulna, we come next to a consideration of those which are found on the upper ends of these bones. In this situation, owing to the conformation of the limb, the tumors are not as well marked in appearance as are those occurring below. In fact, when the limb is examined in an extended condition on its internal aspect, the swelling is not perceptible. If, however, the swelling should attain large proportions—a feature which has not as yet been observed in clinical practice—it is obvious that it would be perceived even here.

<sup>1</sup> This discrepancy is not as great as might be inferred from the text, and can be quite clearly explained. In many instances, upon post-mortem examination in which the lesions have been observed to be symmetrical, the development was found to be very unequal, and in some instances the process had gone on to such a slight extent on one side, that no enlargement had been induced, and had not the tissue been examined with the microscope there would have been no suspicion of its being the seat of pathological change. It can be plainly seen that in every instance the swelling must have attained some considerable development, otherwise it would not be appreciable to our touch. Thus we must take this fact into consideration in determining the symmetrical and unsymmetrical character of these swellings, and we must bear in mind that more bones may be involved than we think, as we are powerless to determine in cases where the lesion has only gone on to a slight degree. In my eleventh case the enlargement at the junction of the epiphysis with the diaphysis of the right radius was very slight indeed, so much so that it was with difficulty made out, but still it was detected, and the feature was observed by several physicians and students besides myself. An instance like that develops a suspicion that in syphilitic children these lesions may be much more common and extensive than we even now think them to be.

But when examined closely on the posterior aspect of the limb, a swelling may be observed upon the olecranon if it has attained an appreciable size. The examination here is best made by semi-flexing the arm, as this movement stretches the integument over the bone and renders the outlines of the olecranon more perceptible than in an extended condition of the limb. The main feature observed is an enlargement outwardly and laterally of the olecranon process. When now we come to examine these bones by the touch, the swellings become very palpable. Those on the radius consist in a general round enlargement of the upper end of the bone, which, however, is difficult to trace in its upper part if the child is fat and its muscles are well developed, but can be readily traced to the joint and felt to move under the tip of the finger, if pronation is employed in cases of very thin children. It seems very probable that if the swellings on the radius became very large the movements of the limb would be impaired. Examination by the touch of the swellings on the ulna present nothing peculiar when practised upon the internal aspect of the limb, but when the bone is felt of posteriorly the olecranon process is found to be enlarged and to bulge out considerably beyond the plane of the bone as traced upwards along its posterior ridge with the tip of the finger. Besides this enlargement outwardly a lateral expansion is felt distinctly, and when the process is examined near its apex or end it is here found to have a very uneven, if not knotty surface. According to present observation the upper parts of the shafts of the radius and ulna at their junction with their epiphyses are not as frequently the seat of these syphilitic swellings as the lower parts are. Thus in ten of my cases in which the lower epiphyses were affected, the upper ones were only found to be swollen in three. Then, again, in only one of these cases were both bones of both arms symmetrically involved, whereas in two cases the olecranon process only was involved. In this connection Fournier's observation is important, as in one of his cases both radius and ulna of one arm only were involved, while in the case related by Ranvier, the ulna of one arm only had been affected and the swelling was felt at the base of the olecranon process. In Bertin's case also, the ulna was the only bone of the upper extremity involved. The conclusion, then, is warranted, based on

these combined cases, that in clinical practice the upper epiphyses of the bones of the forearms are not as frequently the seat of syphilitic lesions as the lower ones are, and that the swellings may be symmetrically developed on both bones of both arms, or that both bones of one arm alone may be involved, or even one bone of one arm, or again one bone of both arms may be thus affected. The swellings of the upper epiphyses may or may not coexist with similar swellings on the lower ones.

Turning our attention now to the condition of the humerus in syphilitic children, we find in clinical practice that it is even less frequently involved than the upper ends of the radius and ulna are. Thus, in only two of my cases was it noted as being enlarged, and the same condition existed in Roger's, in Fournier's, and in Parrot's third case. As thus far observed, the swellings at the lower end of the bone have not attained sufficient size to present such noticeable elevations of the superimposed parts as are observed in the wrist, and they would have, in all probability, escaped observation but for the fact that they were perceptible to the touch. A point of some importance has been here observed, which is, that the swellings are more often developed at the internal condyle than elsewhere. This fact was well brought out by my case, and is substantiated by those of the three observers already mentioned. In Fournier's case, as well as in my tenth case, an enlargement was noted of the whole breadth of the diaphyso-epiphysal junction, but by the former it was stated to be greatest at the internal border. This point possesses interest both clinically and pathologically, as it proves that while the morbid process may involve the whole ossifying end of a shaft of a bone, it may attain greater proportions in one particular part than in another, and also that it may involve a more or less limited extent of surface of the diaphyso-epiphysal junction. In my case, No. VI., the enlargement was seated just above and upon the internal condyle, occupying a space of perhaps three-quarters of an inch of the internal ridge, and was about the size of a peanut. To casual observation this tumor would probably not have been noticed, but when attention was called to it, and the arm was with care slightly flexed and extended, it could be seen as an elevation of the bone playing under the integument. I can readily see that in a very fat child it would have escaped observation entirely.

As regards the distribution of these swellings of the lower end of the humerus, it would seem that they may be either symmetrically or unsymmetrically developed on the two arms. Thus, in Roger's case, both internal condyles were affected, while in my two cases, in Fournier's and in Parrot's case, only one shaft was enlarged. In this connection it is well to bear in mind that at its distal end the humerus has four centres of ossification, and that we may find swellings localized at any one, or at all of them, either at the external condyle, at the condyle proper, at the trochlea, or at the internal condyle. Four of these cases, however, point strongly to the fact, which is important as regards etiology and diagnosis, that at the internal condyle these peculiar syphilitic swellings are very liable to occur. In my tenth case, the swelling involved the whole ossifying region, being quite extensive and presenting an uneven surface to the touch. If the swelling was limited to the trochlea, particularly if it was small, it might escape observation entirely. According to Wegner's observations, this portion of the humerus is not as frequently affected as the upper, and the syphilitic lesions were absent here more frequently than in any other of the long bones, except the upper ends of the radius and ulna, which site he found to be less often the seat of swellings than any other. Parrot found in his fifth case that the upper end of the ulna was involved, and that the lower one was unaffected. Future observations on a greater scale, clinically and pathologically, may perhaps explain this discrepancy. In studying now the changes in the upper end of the humerus, we are forcibly struck with the fact that we have not a case in clinical practice in which these syphilitic swellings were noted here. But in the records of the post-mortem cases of Parrot, Valleix, Wegner, and Waldeyer, and Köbner, we find instances in which this portion of the bone has been affected, and, as said before, Wegner thinks the upper end is more often involved than the lower. In all of these cases, however, it so happened that the lesions were of a severe form, and went on to their last and destructive stages, so that we have not the history of a tumor in this site in which resolution afterwards took place. To suppose that such tumors might occur, we certainly have abundant evidence in the records of the autopsies, and in the fact that here there is a natural predisposition of the parts to the development of them,



namely, an ossifying shaft and an epiphysis of considerable size. Supposing then an instance of the occurrence of these tumors here, it is well to bear in mind that there are at the head of the humerus two centres of ossification, and that the swelling might be general and evenly developed or general and more prominent at a given spot, or it might be localized, and then would be situated at either the greater or lesser tuberosity. This point is deduced by analogy from the case of swelling of the internal condyle of this bone, and will also be exemplified hereafter in the case of the femur. As regards the recognition of such tumors by the eye, much would depend upon the quantity of the muscular and adipose development of the child, for in a chubby infant they might escape observation, while in a very thin one they might be very apparent. In Valleix's case, and in Parrot's third case, the deformity was very perceptible. It is very probable that if the tumor attained a considerable size, it would interfere with the function of the shoulder-joint, in which event attention would surely be called to its existence. Like such lesions developed elsewhere, of course, they may or may not be symmetrically developed. The details of such cases will be looked for and read with interest.

VI.—THE ENLARGEMENTS UPON THE CLAVICLES, STERNUM AND RIBS.

Passing now from the shoulder we naturally come to the clavicle, on which bone we find that these tumors sometimes form. In my tenth case, which is the only recorded one of a living child presenting the lesion, the sternal end of the right clavicle was enlarged. The swelling began about an inch from the end of the bone, and becoming somewhat rounded, having a smooth surface, ended at the sternal joint. In this case the tumor was very evident to observation, and I should think that if these swellings attained even a moderate size, they would here be quite readily seen, even in fat children. They can be more clearly defined by allowing the child's head to hang down without support, while the body is held horizontally, as by this manœuvre the integument is stretched and the sternocleido mastoid muscle pulled downwards out of the way. This position will be found useful in deciding whether a given tumor is seated in the insertion of this muscle or on the sternal end of the bone, or even in regions not connected with these

structures. My case, though unique in clinical practice, has its analogue in Bärensprung's case, which died, in which the tumor was likewise situated at the sternal end. At the autopsy of Parrot's fifth case, both clavicles were found to be swollen at their sternal end. The fact that in the three cases this end of the bone was the only one involved, might leave the impression that this was perhaps the result of chance; but when we consider that at birth all of the clavicle except its sternal epiphysis is formed of true osseous tissue, it occurs to the mind that it is at this end that we should naturally look for these swellings, and not at the acromial end, where no epiphysis exists. Consequently, this form of tumor will not be met with there, though of course we may find periosteal tumors. The cases, as thus far observed, show that, like other long bones, the clavicles may or may not be symmetrically involved in the syphilitic process, for in one case both bones were affected, and in two cases only one bone was. In the child, then, a swelling at the sternal end of the clavicle would naturally excite a suspicion of its being of syphilitic origin. We shall see further on, that these swellings are interesting in the matter of differential diagnosis. As a result of acquired syphilis I have several times seen this part of the bone to be enlarged in patients in whom, from their age, bony union of the two segments had not yet occurred. From the clavicles we arrive naturally at the sternum, upon which bone the syphilitic tumors under consideration have not been found in clinical practice. From the fact that in the early years of life this bone consists largely of cartilage undergoing ossification, it would be very reasonable to suppose that it would be the seat of the syphilitic change, particularly when we consider how frequently it is involved in the acquired syphilis of adults, but still clinical cases are wanting. Yet the records of autopsies show that it has been affected by syphilis, consequently cases may hereafter occur. Being situated under an integument which is never as thickly lined with adipose tissue as some other parts are, this bone is usually readily seen, and of course any tumors upon it would be proportionately prominent.

Thus far in our study of these swellings we have found them developed at the junction of a shaft with an epiphysis, a point where the process of ossification is going on actively. We now

come to the study of them when developed at the sternal ends of the ribs. Here the ossifying end of the bone is not continuous with an epiphysis which later on undergoes ossification itself, but rather with a shaft of cartilage, which as a rule always retains its primitive structure. The difference, then, is simply in the ossification going on at the expense of, in one instance, temporary and in the other of permanent cartilage; the physiological processes being the same in each case. The swellings at the ends of the ribs have only occurred in one out of the fourteen cases seen by me, and in that instance only two ribs were affected on each side, namely, the second and fourth of the right and the second and third of the left side. Parrot mentions the fact that he found at the autopsy enlargements of the ribs in his fourth and seventh cases, and Wegner and Waldeyer and Köbner mention these swellings as being found in the greater number of their cases. The lesion was observed by them here in all stages of its development. We are warranted, then, I think, in assuming that in clinical practice syphilitic swellings at the ends of the ribs are not frequent, at least not as frequent as similar swellings on other long bones; that they may involve all of the ribs, or that only a limited number of ribs may be involved, and that judging from the distribution of these swellings elsewhere, they may be either symmetrically or unsymmetrically distributed. To the touch these tumors give the impression of a simple bulbous expansion of the shaft, their surfaces being smooth. Of course they may be more or less prominent in proportion as they are small or large, and as the child is fat or thin. They possess great interest clinically, as they are so liable to be attributed to rickets. In arriving at the diagnosis, it is well to bear in mind the fact of the limited number of syphilitic swellings, and also their possible unsymmetrical occurrence. Yet we shall find that in rickets, though the symmetrical development of the bulbous ends of ribs is the rule, it also has its exceptions. As the ribs possess in early life two regular epiphyses, one for the head, the other for the tubercle, it is very probable that these swellings may be developed upon them, but as they would be inaccessible to exploration they would be void of clinical interest, except, perhaps, in the event of their unusually large development, in which case they might perhaps produce pressure on a spinal nerve.

## VIII.—THE SWELLINGS AT THE EXTREMITIES OF TIBIA AND FIBULA.

Pursuing now the same course in our study of the bone-lesions of the leg as followed in that of the arm, we commence with the ankle. As developed upon the lower end of the tibia and fibula, the swellings have the same general characters as those found on the corresponding part of the radius and ulna. In tracing the continuity of the bones downward with the finger, a perceptible swelling is discovered about two inches above the extremity of either malleolus. The swelling usually begins quite abruptly, and attaining a height of half or three-quarters of an inch, it either merges into the expanded epiphyses, or is distinctly limited to a space of about an inch or an inch and a half in length, in which case it is recognizable as a ring surrounding the bones at their diaphyso-epiphysal junction. In those of my cases in which the epiphyses were generally expanded, the swelling was found not to involve the extreme portion of either malleolus, and it was evident that the morbid process stopped short of this point. In the ringed form the swelling was distinctly traceable all around the bones, and it seemed to the touch as if perfectly continuous, their line of apposition being apparently lost. This line, though sometimes quite difficult to determine, can generally be distinctly made out, by tracing downwards between the two bones with the tip of the fingers, and in the examination of a healthy subject it is readily found. When, however, these bones undergo this local enlargement there seems to be a general fusing or soldering together of them. The surface of the swellings was quite smooth, and in no instance have I found it nodulated. The integument, which in this part of the leg is less provided with adipose tissue than any other part except the region of the knee, is usually stretched, but not in such a manner as to induce structural change. It can usually be slid over the swelling beneath. The resulting deformity of such bone-enlargements is generally quite well marked, rather more so than at the wrist. Of course, it will vary with the greater or less development of the swelling, and with the amount of adipose tissue deposited here. It is well to remember that the child's leg, owing to the delay in muscular development, does not expand from ankle to calf, as it does later on; that the adipose tissue is more evenly distributed, particularly so at the ankles; and that the limb in

its continuity preserves a somewhat uniform shape, consequently that these swellings, if not large, might not be regarded by the child's attendants as abnormal, and might even escape their observation, and could of course under the circumstances escape that of the surgeon, unless he examined with reference to them. There is another point which is of especial interest to the surgeon in determining whether or not swellings exist upon these bones in infants, and that is that there is very often a seeming disproportion between the size of the shafts of the tibia and fibula and their epiphyses, the former appearing quite thin, while the latter feel as if unusually large. This condition, which is normal and quite frequently found both in these bones and in the radius and ulna, might, if not borne in mind, lead to the wrong impression, that an enlargement of the bones existed.<sup>1</sup> In those cases in which the swelling is well marked the deformity is readily seen and is of peculiar appearance. It is most marked on the anterior aspect of the ankle just above the tarsal bones, and it looks as if the bones of the leg had been dislocated forwards. The swelling is also in such cases well seen on the outer and inner sides of the ankle. In two of my cases the parts above the ankle presented a somewhat quadrangular shape, which was well marked. In exceptional cases the swelling may be more developed at one part than at another, and in some it may be very slight; the rule being that it should be generally distributed. The local development of the swelling was observed in one of my cases, in Bulkley's case and in Parrot's sixth case.

The statistics of the swellings at this portion of the tibia and fibula show that they occur here quite frequently; indeed Weg-

<sup>1</sup> Melchior Robert (*Nouveau Traité des Maladies Vénériennes*, Paris, 1861, page 692) states that he has seen cases in which, as he expresses it, the syphilitic virus was too feeble to cause special manifestations, and in which a species of atrophy of the diaphyses and thickening of the epiphyses was noticed,—a condition which he attributed to syphilis. From our knowledge of the influence of this disease upon the growth and development of bone, it is reasonable to suppose that it has no direct or specific action in causing this condition, particularly as it is said to arise *de novo*, and not to result, according to the author, as a sequela of typical syphilitic lesions. It would seem that these cases were similar to those above alluded to, in which the imperfect development was perhaps even more marked. If we concede to syphilis any influence in producing this condition, it must be in the power, which it, like any other debilitating disease, has in impairing the growth and nutrition of tissues generally.

ner ranks their frequency in this situation next in order to the lower end of the femur, which site he thinks the most frequently affected of any portion of the long bones, and Waldeyer and Köbner found them here also quite often. In the fourteen cases seen by me, swellings at the lower end of the tibia and fibula occurred five times; in Parrot's eight cases three times, and they were found in Valleix's case, making a total of nine cases. As regards the mode of their distribution, they were found on both legs in three of my cases and in Valleix's case; in Parrot's cases the bones of the right leg were involved in case three, and those of the left in case six, the tibia of one leg and fibula of the other in case eight; in my ninth case the left tibia and right fibula were the bones involved, the left fibula being only slightly affected, and in Bulkley's case only one bone, the fibula, was involved. The conclusions are, then, that the swellings may be symmetrically distributed on both bones of both legs, or they may occur on both bones of one leg, on either one or other of the bones of each leg, or a swelling may occur on one bone of one leg. They have always been found to exist coincidentally with similar swellings on other bones; thus, in my four cases, there were in two instances similarly situated swellings on the radius and ulna; in the two others, besides this coincidence, there were swellings on other bones; in Bulkley's first case the swelling on the fibula was coincident with syphilitic lesions of the phalanges, metacarpal and metatarsal bones; and in Parrot's, Wegner's, Waldeyer's and Köbner's cases, various and numerous other bones were found to be coincidentally the seat of similar changes. There is no reason why this site might not be the only one involved in a given case of syphilis, but as yet we have not the records of a case showing the fact. In my eleventh case the distal end of the tibia and fibula were enlarged, the lesion having gone on to a degenerative stage, and the only other appreciable bone lesion was a very slight swelling of the distal end of one of the radii. The tibia and fibula are very often affected at their lower ends by rachitic swellings, but the distribution is generally symmetrical, and other long bones, such as the radius and ulna, ribs and femora or the cranium, may or may not be coincidentally involved, they being as a rule thus affected. This point will be touched upon when we come to treat of the diagnosis of these swellings.

The distribution of the soft parts at the knee is such as to render the examination of the bones which compose the joint quite easy, particularly in the case of the tibia and fibula. The contour of these bones, even in the infant, is generally very readily discernible to the naked eye, and their exploration by the touch is proportionately easy; consequently any swellings which may occur here are generally very likely to be noticed, and of course they can be examined readily. The peculiar swellings, such as we have found on the lower ends of these bones, are also found here. In the fourteen cases which I have seen, a swelling upon the tibia was found in but one. In that case the right tibia was involved and the swelling was distinctly visible on the anterior and lateral or internal portions of the bone, where the elevation of the integument was very well marked. The swelling, commencing externally just at the head of the fibula, was situated just above, and involved the tuberosity of the tibia, running around the bone and being distinctly traceable until it reached the posterior surface, where it could not be made out. The elevation of the tumor was fully three-quarters of an inch, and its area at its base was certainly an inch and a half. Superiorly it merged into the head of the bone, just near the joint. Its surface was somewhat nodulated anteriorly, but it was quite smooth laterally. In Roger's case a similar enlargement was found anteriorly. A similar swelling was also found in Valleix's case, and Parrot, at the autopsy of five of his cases, found the head of the tibia to be the seat of morbid change. Of these cases there was one in which both tibiæ were enlarged, another in which the tibia and fibula of one leg were swollen, and three in which only one tibia was involved. Parrot states that in his sixth case the swelling was more perceptible internally than anteriorly. Waldeyer and Köbner found this portion of these bones affected, and Wegner did also. The latter thinks that the swellings upon this site occur the fifth in the point of frequency of any of the long bones, while Parrot places their frequency in the third rank, and those of the fibula in the sixth. It will be seen that in clinical practice only two cases have occurred in which these swellings were found, and in each the tibia was the bone involved; one of these cases is my ninth, the other is Roger's case, while they have been observed at least seven times at the autopsy. It is

well to bear in mind, in explanation of this seeming discrepancy, that the cases of Parrot and Wegner were those of the severest form of syphilis, in which many bones were affected and in which the other lesions were so severe as to cause death. In the clinical cases the syphilis was comparatively mild in form and did not destroy life. We can scarcely admit these cases unreservedly for purposes of comparison; but if we should do so we should find that they warrant the following conclusions:

That the upper part of the tibia is more frequently swollen than the same part of the fibula; that the swelling may be symmetrical on the tibiae of the two legs, or it may occur on only one bone. We have no recorded instance in clinical practice of a swelling upon the fibula alone, nor upon it and the tibia, nor, again, of swellings on both bones of both legs; such cases, however, may occur. In this situation we find that though the swelling may involve the whole ossifying upper end of the shaft, it may be greater or rather more perceptible at one portion of it than at another. This, of course, is either due to the fact that the morbid process is greater at a given spot, or that it is distinctly localized there. We have already pointed out the same feature at the lower end of the humerus, where its existence was explained by the fact of the multiplicity of ossifying centres; but this explanation fails in this case, as there is but one ossifying region, which, however, is very extensive.

#### IX. THE SWELLINGS UPON THE FEMUR.

Coming now to the lower part of the femur, we find that owing to its being deeply seated amidst muscles, fasciæ, etc., and also to its being covered with a greater or less amount of adipose tissue, that its examination is not very readily accomplished. In children, however, there is not the same resistance or firmness of the soft parts as may be observed later in life, consequently in them the conditions are not as much unfavorable to physical exploration. The conditions of course vary very much with the amount of muscular and adipose development of the child. It is a situation, however, in which, when the swellings are developed as low down as the diaphyso-epiphysal junction, they would be very likely, if small, to pass unrecognized, more especially by the eye and perhaps by the touch. In but one of my cases was this part of the femur



found to be swollen. In this there was no perceptible elevation of the integument, though the child was thin, nor could any swelling be discerned if the limb was viewed while it was being alternately flexed or extended. When deep pressure was made upon the bone, a swelling could be felt just above each tuberosity, which could be traced to the anterior surface of the bone and there quite distinctly made out, but it could not be felt of posteriorly. The swelling arose quite abruptly from the bone, and was fully five-eighths of an inch high, and occupied a longitudinal area of about an inch and a half. Its surface was quite smooth and it rounded off, losing its lower edge in the bone. The integument was of course unaltered. According to Wegner, the lower end of the femur is more frequently found to be the seat of the peculiar syphilitic changes which we are considering than any other bone in the body of any variety. Whether this fact is to be explained by the condition of development of the femur, its lower epiphysis being the only one in the body in which ossification begins before birth, consequently the one in which the processes are most active, I am unable to say. In clinical practice, according to our present knowledge, it seems that it is very seldom involved; future observations, however, may establish a greater frequency of occurrence. Bärensprung mentions having found the femur enlarged at this site, and Parrot found it in three of his cases. Judging from our present facts, we should say the swelling is not as a rule developed symmetrically on both limbs, but of course such cases may occur. Although our present experience shows us that these swellings are uniformly distributed along the diaphyso-epiphysal junction, we may infer from analogy that they may be developed in one portion in greater size than in another, and in fact that the morbid process may be localized to one spot, as we have already found it upon the humerus and tibia. This part of the leg should be carefully examined in cases of hereditary syphilis, particularly if other bone lesions are found.

The deeply seated position of the upper end of the femur renders examinations of any swellings upon it rather more difficult than at its lower end, and here such swellings might readily pass unnoticed. I have never had the opportunity of examining any syphilitic swellings on this portion of the femur, as

they did not occur in any of the fourteen cases seen by me. They have, however, been found quite frequently after death, as Wegner places them in the third rank as regards frequency, and they were also found by Waldeyer and Köbner. Besides these observers, Parrot mentions them as occurring in several of his cases, and Bärensprung gives fragmentary details of a case in which he observed a swelling of the upper part of one femur which coexisted with a similar swelling on the lower part of the opposite femur. Our knowledge of these swellings, then, is not grounded upon clinical observation, but is derived by induction from our study of the anatomical structure of the bone, and also from analogical facts observed in these tumors when developed upon other bones of the body. We know that the upper end of the femur has three distinct centres of ossification, one for the head, another for the great trochanter, and a third for the lesser trochanter, consequently we can reasonably assume that these swellings might be developed at any one or at all of these sites. In case a swelling was developed at the neck of the bone, it is probable that the capsular ligament would present its recognition and that it might render its examination impossible. If, however, a swelling was formed at either of the trochanters its existence could be determined, even if it was only of moderate size, for in Bertin's case, a swelling of the size of a pigeon's egg was found upon the left great trochanter, and in Parrot's third case both of the lesser trochanters were found to be affected. In Putegnat's case, it is probable that the change took place at the neck, and as the swelling underwent degeneration, a dislocation of the bone was produced. This fact shows us the importance of the early recognition of this syphilitic lesion of bone and the necessity of a prompt and efficient treatment. There is a point of great interest relating to this portion of the femur, which may be of value as regarding syphilitic tumors developed here. It is this: early in extra-uterine life that portion of the femur which includes the neck as far down as the bones of the two trochanters is composed of cartilage, and is continuous with the shaft below which is already ossified; consequently at this spot the processes of development are very active, and are very likely to be modified by syphilis. So that there is good reason for supposing that we may find a swelling involving the

whole breadth of the shaft at this position, which would, of course, be proportionately larger. We are warranted, then, in assuming that we may find syphilitic swellings at the junction of the shaft with the upper portion of the bone; that, like those developed upon the lower end of the humerus, they may be either generally distributed over the whole ossifying surface, or may be localized at a given spot, in which case they would be either the result of a local exaggeration of the morbid process, or of that process being confined to that particular spot. As the surface of the femur is somewhat uneven, it is probable that the surface of the swellings would not be perfectly smooth. Reasoning again by analogy, we should be prepared to find either a symmetrical or an unsymmetrical distribution of these swellings on the bones of the two legs; at any rate, it is fair to presume that one localized spot might be the seat of swelling on one femur, and another spot on the other, or again a generalized swelling. Swellings on other bones will in all probability be formed, and similar changes may be observed at the other end of the femur, as was observed in Parrot's case.

(To be continued.)

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#### PHYSIOLOGICAL LENGTHENING OF THE CERVIX UTERI BEFORE, DURING, AND AFTER LABOR.

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BY ISAAC E. TAYLOR, M.D., New York.

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(Read before the Medical Library and Journal Association, February, 1874.)

I HAVE selected for a few remarks this evening "The Physiological changes or processes incident to the cervix uteri before, during, and after labor." These observations will tend, I hope, to elucidate and confirm still more a subject which has claimed my attention for over twenty years. I was surprised at this late day to recognize in the *Edinburgh Medical Journal* for June, 1873, the following remarks "On the changes in the cervix uteri during labor, by Duncan, of Edinburgh":—

"At this time, shortly after labor, the cervix uteri is in a state contrasting remarkably with that of the body of the uterus, being relaxed, thin, and elongated. Labor, which, when

completed, leaves the body of the uterus shortened, thickened, and firmer, or hardened, leaves the neck elongated, thin, and softened. It is often seen to be about three inches, and Madame Boivin describes it as sometimes found five or six inches long immediately after labor is over."

In the March number, also, for 1869, of the same journal, in a short paper "On the increased length of the cervix uteri after labor," Dr. Duncan says: "I wish now to describe a *remarkable* and quite *unexplained* condition of the cervix uteri found after delivery. This condition is the greatly increased length of the cervix as measured by the only good means of measuring the extent of the arbor vitæ. The effect of labor on the body of the uterus is, as a result of the evacuation of its cavity, contracted in all its dimensions, and its walls are consequently much thickened and hardened. On the other hand, the process of labor produces opening up and dilatation and general enlargement of the dimensions of the cervix, and after labor is over it *is found* to be *thinner* and *more relaxed* than *before labor*, *enlarged* and *especially increased in length from above downwards*." To illustrate this point from his own experience, he refers to a single *post-mortem* specimen which Prof. Turner gave him after a recent delivery.

As these opinions are at variance with my own observation and investigation and experience during the last twenty years, I propose offering a few remarks upon them.

Before I enter on the chief points of my subject, I shall quote from some observations I made in 1843, when I edited Dr. E. Kennedy's work on Obstetric Auscultation, having at that time extensive opportunities for investigations on uterine affections. Relying more generally on the tactile examination, I made the following remarks: "A few hours after labor the uterus and the vagina are greatly relaxed and dilated, the contraction gradually taking place. On the 8th day the anterior lip of the cervix uteri can be felt to be longer than the posterior, and slowly assumes its normal form. On the 12th day the cervix has more consistence and shape. On the 21st day it still feels soft and quite large."

These investigations went to prove the opinions of Hohl, Kilian, Busch, Fuygel, and others, as I then fully believed.

In March, 1862, I read a paper "On the non-shortening of

the cervix uteri during gestation, even to the completion of pregnancy," before the New York Academy of Medicine.

I shall, however, go as far back as 1852, when I first enunciated the opinion that the views of the older obstetricians, which had been entertained for several centuries and recorded in the obstetrical works, that the cervix uteri was totally obliterated from above downwards at the close of gestation, or from below upwards, as taught by Stoltz and Cazeaux and others for the last fifty years, was a great error; but that "The cervix uteri during pregnancy retained its natural length up to the commencement of true labor, and was *sometimes longer*." Of the thirteen propositions entertained in that paper, in proposition 10 I stated, "That after labor, if the neck has not been much lacerated, the cervix uteri *returned* to its *natural length* very *soon*, though it feels to the touch soft and patulous."

These views I taught every winter, and explained to the students attending Bellevue Hospital. They were also presented to several medical societies.

When I read my paper before the Academy of Medicine, I presented several post-mortem specimens taken from patients who died suddenly at the close of pregnancy, during and after the first stage of labor, proving the validity of my views from that source, and independent of the large number of cases of gestation which were examined in the presence of the house staff. Among the specimens was one taken from a patient who died from post-partum hemorrhage, where the hand had been introduced by one of the house staff to remove the placenta, showing that the cervix uteri had returned immediately after to its natural form and length. In 1864, when I published an article on Placenta Prævia (Transactions New York State Medical Society), several more post-mortem specimens had been examined. In one of them the body exhibited the thick, reddish, striated muscular elements, while the cervix,  $1\frac{3}{4}$  inches long, gave its white, fibrous, bloodless tissue, with the longitudinal and lateral folds of the arbor vitæ, and the cervical glands well developed, demonstrating the significant contrasts in breadth, length, color and structure, without any expansion or dilation or flabbiness of the cervix uteri.

I extract from my monograph on Procidencia Uteri, 1870, published in the Bellevue and Charity Hospital Reports, the

following measurements of 17 post-mortem cases from patients who died suddenly at the commencement of and after labor, and not from any disease of the uterus:

1 specimen measured	$2\frac{5}{8}$ inches long.
2 specimens	" $2\frac{1}{2}$ "
2 "	" $2\frac{1}{4}$ "
12 "	" from $1\frac{1}{4}$ to 2 inches long.

From 1870 to 1872 four more were exhibited to the classes at Charity Hospital: one was a case of placenta prævia, where the cervix uteri measured  $2\frac{1}{4}$  inches after the placenta was removed after death from the *internal* os uteri. *Two* of the others were 2 inches and one  $1\frac{1}{2}$ , making in all 21 post-mortem specimens before, during, and after labor. Of this number—

10 were from	2 inches to $2\frac{5}{8}$ inches long.
11 " "	$1\frac{1}{4}$ " 2 "
16 cases were before labor and 5 cases after.	

I could add several more, but they were consequent on diseases affecting the uterine organs, and in one lately taken from a patient who died of puerperal fever, the cervix was  $2\frac{1}{2}$  inches long. I do not, however, include this class.

In the paper of Duncan, 1869, the specimen of Prof. Turner was  $2\frac{3}{8}$  inches long. Müller's case in 1868 was 2 inches.

Dr. Goodell, in the Transactions of the Obstetrical Society of Philadelphia, 1873, refers to the cervix uteri as being 3 inches long, in one of the cases of Dr. Parry of ruptured uterus *before* delivery. In the Transactions for 1872, Dr. Ingham also reports a case of abortion after *six months'* gestation, who died, and the cervix measured  $2\frac{1}{2}$  inches long.

Reference has been made to Dr. E. Martin's measurements of the cervix uteri in 1866. In 7 recently delivered women they were as follows:—

1 case of	$3\frac{1}{4}$ inches	1 hour after labor.
1 "	3 "	1 " "
1 "	3 "	48 " "
1 "	$2\frac{3}{4}$ "	$2\frac{1}{2}$ " "
1 "	$2\frac{1}{2}$ "	80 " "
1 "	$2\frac{1}{2}$ "	12 " "
1 "	2 "	$1\frac{1}{2}$ " "

These measurements cannot be considered as perfect for several reasons, or as illustrative of the exact condition of the cervix, as the cases of post-mortem. They have their value as far as they go in their bearing on the subject.

It will be noticed that in more than half of the post-mortem cases by myself, and including those of the authors referred to, the cervix measured from two to three inches. While on this increase before labor of the cervix uteri, I will cite from M. Caseaux's *Midwifery*, 1849, the following case which he saw at his clinique, and which he considered a *very* remarkable case of incomplete prolapsus uteri during pregnancy, in which the entire neck measured two and three-quarters inches long. My late friend, Dr. J. C. Nott, reported a case in 1867, of which I have a copy. He considered it as an *extraordinary* hypertrophy of the cervix uteri during gestation, and it measured three and one-fourth inches long. But still further, as illustrating this physiological lengthening of the cervix uteri before labor, though prolapsus exists, and which does not vitiate or set aside that condition of the cervix which I have established in addition to those of Nott and Caseaux, I will relate the following case of my own, reported by Dr. G. S. Sherman. It was considered to be a case of *precidentia uteri*, the uterus being two and a half inches external, and the patient, however, being pregnant, as the result proved. Every means by way of diagnosis was resorted to to discover it, but proved unavailing. The cervix felt long and cylindrical, and of the thickness of the thumb, as is the case in cases of *precidentia*. The sound was introduced, and it passed up ten inches. The instrument was felt above the pubes. The patient aborted two days after of a three and a half months' *fœtus*. The same characteristics were manifested in another case of a like nature at Bellevue Hospital, as reported by Drs. Young and Stoddard, the house physicians. The uterus in this instance measured eleven inches. In these last two cases the cervix uteri, with the isthmus of the uterus (for the cervix proper could not have been of that length), must have been six or seven inches, as the *fœtus* at three and a half months could only occupy a space of not more than three and a half inches by three and a half inches. In both of these instances, very soon after delivery the uterus was reduced to three and a

half inches, assuming its concentric form and shape, and felt solid and firm to the touch.

Independent of what I have adduced on the living subject, as well as the morbid specimens, I will give the testimony of B. Seiler, of Dresden, 1832, in the representation of his plates, which we believe to be faithfully given. They were intended to show the embryo and membranes at the third month, but they will also illustrate the lengthening of the cervix commencing as early as the third or fourth months. The cervices in these illustrations were not less than two and a half or three inches. Boivin asserts that during the early part of gestation the cervix may be two inches, Filugelli that it may be three inches, although they hold it is obliterated at the close of pregnancy. I think sufficient evidence has been produced that the cervix uteri is not only lengthened to the full time of labor, but that this increase may commence in some cases as early as the third or fourth month. Reverse,ly, it can be demonstrated by the plates of Hunter, showing the increase after the head is removed from the internal os. I have adduced so much on the subject of ductility of the uterus in my paper on procidentia, that I will not enlarge upon it at this time. We will all concede that it is a recognized fact, that the healthy uterus is capable of extension, as is proved by its behavior under stretching upwards and pulling downwards. This is evident in some kinds of cases of amenorrhea of three or four months' duration, as I have seen, and where the uterus, after a measurement of three or four inches, will return to the natural standard after the menses have taken place.

Now, if this increase of length, created not solely by ductility, exists in the cervix and isthmus of the uterus in one, two, or several months or years after labor, and measures four, five, and six inches from this part of the womb, it is certainly not remarkable, as Hunter, Caseaux, and Nott suppose, that the physiological changes in the body of the uterus, as well as the cervix and pelvic organs generally, during pregnancy should take place; and that the cervix, which is so ductile and stretchable, should be elongated one or two inches more beyond its ordinary length of one or one and a quarter inches. We are not to mistake the isthmus or intermediate part of the uterus, as it is called by Sappey and Guyon, which is that part



existing between the body and the cervix, and which has no relation with the physiological function of the body, and which is so clearly evident in cases of procidentia uteri under the so falsely called hypertrophic elongation of Huguier. If the arbor vitæ is a good test of the length of the cervix, it will be very difficult in some instances to decide as to the appearance of the complications, as they are so very different in some specimens from others. In some only a few traces of the penniform rugæ are perceptible, owing to the frequent pregnancies, the cervix being only sometimes three-quarters of an inch long. No two specimens are alike in appearance and in length.

It is apparent that in more than half of the post-mortem cases by myself, and the single specimens of Müller, Duncan, Goodell, Ingham, and Boivin, and if we include the seven cases by measurement, of Martin of Berlin, the cervix was from two to three inches long. During the last month I have examined with my house-physicians, Drs. Figueras and Steuer, fifteen patients, as I deemed that quite sufficient for further illustration, in from one hour to twenty after labor, by ocular inspection. In all the cases the infra-vaginal part of the cervix was found to be of the same length and breadth and consistency incident to the softened condition of the uterus at the time of labor, and as natural in form and firmness as I have seen just before labor, only divested of the bluish tinge which exists in a great many cases of pregnancy.

The os uteri was only in one instance severely lacerated. There was no laceration in the vagina, and in only two cases was there abrasion of the lower part of the vulva, on each side of the labia. The fourchette was generally intact.

If the vaginal portion of the cervix presented this appearance directly or soon after labor, it is fair to conclude that, as the contractility of the inferior part existed, the whole cervix was contracted and as natural in size and length as before labor, and as the post-mortem specimens at the full term of pregnancy and after labor attest.

The increase or lengthening is not therefore due solely to the labor, which might aid its increase mechanically a little, but to the increase which physiologically takes place before labor.

All the proofs I have adduced negative the opinion as recorded by Duncan and others, that after labor is over the

cervix uteri is found "to be thinner and more relaxed than before labor, enlarged, and especially increased in length from above downwards, or after labor the neck is elongated, thinned, and softened." If these observations of Duncan apply to the uterus on the living subject, then the investigations I have made on the living subject disprove them. If we take the autopsic examinations they are also at variance with what is correct and true. The body is, on the contrary, in the cases of sudden death, not firmer or hardened, but flabby and thin, and in some instances so thin as to be diaphanous in some parts of its structure, and as it is noticed in rupture of the uterus, while the cervix is contracted and natural in length as it was before labor commenced.

The opinion of Boivin as given is, that the cervix after labor is three inches long, and in some instances five or six inches, though Boivin, it appears, refers to only *one* post-mortem specimen immediately *after* labor. Guillemot, referring to this case, says that "the uterine neck in this state of flaccidity presents five or six inches in length, and four or five inches in diameter." Boivin herself remarks "that at the upper part of the developed neck, where the internal orifice had been, the circumference of the cervix is thirteen inches; and this part is now five inches above the external orifice." It appears, therefore, from this description of Guillemot, as he speaks particularly of the *flaccid* condition of the cervix, and the measurements by Boivin, that the laws as they are received and believed at the present day, governing the sphincter muscles, had signally failed, and that the cervix uteri had become either functionally paralyzed or was in a state of perfect and complete atony through exhaustion of the system by some cause, otherwise the cervix would have contracted. Bowman and Todd assert that their (the sphincters') contractility is superior to that of the walls of the cavity, consequently their passive contractility endures, while that of the parts above is being gradually mastered by the contents, or where the contents or excretions excite the contractions in the wall of the cavity containing them, this overcomes the passive contractions of the sphincters, and evacuation occurs, and contraction follows. The explanation which Guillemot gives of Boivin's case I witnessed in a case I attended with Dr. Henschel, many years ago, of

tedious labor with version, in consequence of hemorrhage, death ensuing very soon after delivery.

Examine the diagram of Simpson and T. Smith, which was intended to represent the exact attitude of the fœtus at the full term of pregnancy, and you will find that it will not only illustrate their views of the dilatation of the cervix uteri before labor, but it will show the measurements of the cervix as described by Boivin, in her case of post-mortem after labor; Duncan's description of painless labor, for hours or days before true labor ensues, agrees with that of Donkin, though Duncan assents to the non-obliteration of the cervix uteri in some cases.

It is singular, and I may use the word *remarkable*, that if you also examine the plates of T. Denman, who holds the same view as to the obliteration of the cervix uteri before labor, you will find that he presents a drawing or diagram he had taken from a woman who died in the act of parturition, and which representation is considered classically correct. Here the cervix is not in the least dilated or expanded, and is one and a half inches long and intact. This is only an additional proof, how views and opinions will and have been maintained and be circulated, without having any substantial basis to support them, but, on the contrary, evidence to negative them.

As I have thus far made my remarks only on the cervix uteri before and after labor, I will now have to touch upon the mechanism of labor, as this will show how the lengthening or increase may take place during that process.

The mechanism of labor, as advocated by some, as well as by Duncan, who holds "that a process of silent or painless labor goes on for some hours or *days* before the supervention of active painful labor," is as follows: On digital examination there is found merely a perforation or hole in the lower segment of the wall of the grand uterine cavity, and when true labor occurs the body of the uterus, in its regular contractions, acts upon the cervix and vagina equally, and at every point *pulls* upon them, and pushes the fœtus into and through them, somewhat as the arms pull on the leg of a boot, while the foot is being pushed into and through it. It has been demonstrated by various authorities that there are no longitudinal fibres in the cervix, or only a few isolated ones; this mechanism therefore cannot prevail. We might as well say that the vagina is

pulled back, or the perinaeum, as the child is riding over it, when we recognize that it only recedes, and contracts as soon as the head is born.

The motor power exists solely in the muscular part of the uterus, the body, and through that power the head of the child is driven at the commencement of labor against the internal os of the passive cervix first, whether painless labor exists or not; as the head is forced onwards, covered by the white fibrous structure of the cervix, the reduplications of the mucous membrane, the arbor vitæ are gradually unfolded, lengthening or increasing the cervix, which was one and a half, or two or three inches just before labor, to nearly double its length, and increasing its breadth to a circumference of thirteen or fourteen inches, this expansion and lengthening corresponding to the size of the child's head—the cervix then simply recedes when the largest diameter of the child's head has passed through it, and is not pulled back. This expansion and dilatation is accomplished only at the full term of gestation, or when labor commences. After delivery the natural contractility of the cervix immediately takes place, and it is not left relaxed, expanded, or elongated and thin. An apt illustration of this point, and one recognized any day, is the distention and expansion of the horse's anus when he dung, and its recession and contraction directly afterwards.

The plates of W. Braune, of Leipzig, represent the cervix uteri in a frozen subject, expanded by the child's head, measuring three to four inches in length and thirteen inches in circumference.

In a very instructive case at Bellevue Hospital some years since, in the first stage of labor, the child's head capped by the thin, white fibrous structure of the cervix, like a piece of tense stretched india rubber, and distended and elongated to the size of the child's head, and the os tincæ opened to the size of a two-shilling piece, was distinctly seen. The vulva could be expanded easily, owing to the great relaxation of the parts, the head of the child being in the cavity of the pelvis. During the last month the same appearance was remarked, although the uterus was not as low in the pelvis. The living representations transcend in value those in the frozen subject or those by diagrams. Every obstetrician knows that the cervix uteri must be expanded, dilated, stretched and lengthened to

the capacity of the child's head, or the child could not be delivered, whether he believes in the obliteration of the cervix before labor, and its expansion after labor has commenced, or not. It is therefore not remarkable, as Duncan supposes, but perfectly natural for these structures, that directly or soon after labor the cervix uteri should be found from two to three inches in length. This lengthening, as we recognize it before, and it is confirmed after labor, is greatly at variance with the views and opinions held by the older obstetricians, and by a large number at the present day. The ductility, as I have shown and demonstrated, is consequent on the physiological condition of softening during pregnancy, and the post-mortems prove it. The direct ocular inspection then and in the act of parturition, and after labor, proves it. The cervix resumes its contractility, and its natural form, shape, and consistency, and is not, as Duncan and others assert, "thinner, softer, and elongated, and dilated from above downwards." Neither is it found, as Boivin has said from only one post-mortem specimen, five or six inches in length, and flaccid in the living subject, unless from exhaustion or when it has undergone, in very exceptional cases, functional paralysis. These points, to some who hold different views, may appear to be of little moment; these numerous investigations nevertheless tend to a more correct and just appreciation of Nature's simple and beautiful mechanism and acts in the great physiological process of gestation and parturition.

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## TWO CASES OF IMPERFORATE ANUS.

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By J. H. POOLEY, M.D., Yonkers, N. Y.

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(Read before the N. Y. Obstetrical Society, January 6th and April 7th, 1874.)

CASE I.—In May, 1870, I reported in this Journal (vol. iii., No. 1) a case of imperforate anus, in which, failing to afford relief in any other way, I performed inguinal colotomy in the left groin, according to the plan usually denominated Littre's, and it is the sequel of that case which I am now about to report.

During the four years and more of this child's life he grew and thrived admirably, enjoying perfect and uninterrupted

health, and was at the time of his death as large and fine a boy as I ever saw in my life.

The artificial anus was very little inconvenience, and the action of the bowels was, most of the time, quite regular and healthy; at the end of about three years, the opening showed some tendency to contract, but this was easily overcome and prevented from progressing further, by the occasional introduction of the mother's finger, a resource which, on many accounts, I consider preferable in such cases to any other; there was an occasional eversion and protrusion of the mucous membrane at the artificial anus, but this was always easily reducible, and, as far as I know, only occurred three or four times in all.

At the time when the case was first reported, it was supposed that a connection which existed between the intestine and the bladder had closed, but this was a mistake; it never closed, but whenever the exit of feces from the artificial anus was at all interfered with, some of it would make its appearance in the urine.

On the evening of Dec. 8th, 1873, I was called to see this child. Upon reaching the house I found that he was suffering from a protrusion of the intestine at the artificial anus, which was several inches in extent, and had existed all day, and which the mother had made several ineffectual efforts to return. He had also, I learned, for a day or two before complained of pain and uneasiness in the abdomen.

I placed the child under the influence of chloroform, expecting, as on former occasions, to be able to reduce the protrusion with ease. In this, however, I was disappointed, and it was only with great difficulty, and after efforts protracted for over an hour, that I was able to get it back; this was effected about nine o'clock, and I left the child sleeping quietly from the influence of the chloroform.

Next morning, Dec. 9th, to my utter surprise the father came to inform me that the child had died at 4 o'clock, A.M. He had rested tolerably well, waking at intervals, but not complaining, and at the hour mentioned his mother had taken him on her lap, when quite unexpectedly, with one or two gasping inspirations, he died.

Only a few minutes before he had seemed quite bright, and had been talking with animation about a favorite picture-book.

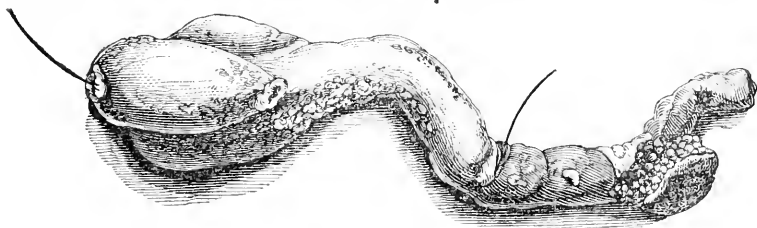
A post-mortem made the same afternoon revealed the following facts:

There was general and intense peritonitis, the parietal and visceral peritoneum were both highly congested and dry, and had a pasty feel to the finger; the surface of the intestine in particular had wholly lost its characteristic polish. There was very little fluid in the peritoneal cavity, and no trace of feculent odor, or other evidence of feculent admixture.

There was a rupture irregular in form, and about the eighth of an inch in extent, through the lower part of the protruded intestine.

The edges of this rupture were thickened and rounded, giving evidence of a spontaneous perforation of all but the peritoneal coat, which was the only portion actually torn through at the time of the reduction, and the whole of the protruded portion of intestine was in a diseased condition, being highly congested, and its mucous membrane thickened and softened.

With regard to the malformation itself the following condition of things was found. There was no rectum, the lower part of the colon was expanded into a rounded sac, nearly three times the size of the urinary bladder, and situated immediately behind it, and firmly united to it by somewhat dense connective tissue.



The interior of this sac presented in an exaggerated form the transverse rugæ of the colon, it was pale in color, and perfectly empty with the exception of three or four flat, perfectly dry and brittle pieces of apple skin, slightly encrusted with salt, and presenting recurved edges. Owing to its close connection with the bladder, this intestinal receptacle was situated at the top and front of the pelvis, far away from the ordinary situation of the rectum; there was a direct communication between this colic sac and the urethra (not the bladder); and in the accompanying illustration the straw at the lower portion of the

figure, which is seen protruding from the urinary meatus at the neck of the bladder, passes directly into the intestine, and out above at the point of rupture.

This peculiarity of the communication explains the fact that it was only when free exit from the artificial anus was interfered with did any feculent matter make its way into the expansion of the colon and appear in the urine, and that no accumulation took place in the bladder.

The artificial anus was found to have been made exactly at the point of election—the sigmoid flexure of the descending colon; and a considerable deposit of adventitious tissue had made the union between the intestine and integument exceedingly firm.

The post-mortem showed, moreover, that unless great and incredible changes had taken place in the relation of parts since birth, an operation in the right groin, as recommended by Huguier and endorsed by Bryant, would most probably have opened into small intestine, as the cæcum and first part of the ascending colon was deep in the iliac fossa, while the small intestine floated freely above it, and would infallibly have bulged forward into the incision when the peritoneum was opened.

As to the peritonitis which proceeded to such a rapidly fatal issue, it seems quite unlikely that the rupture produced, or at least completed, no doubt, at the taxis, had anything to do with it; but it probably existed prior to and aggravated the prolapsus itself, so that whether it would have resulted disastrously or not, which I regard as by no means certain, from the habitually empty condition of this part of the bowel, had the child survived longer, it was not the direct cause of death.

The case is one of very great interest and importance in two ways: it adds another illustration of the conditions that may be supposed to exist in such cases, and by the prolongation of this child's life (which lived to be four years two months and fifteen days old), is sufficient encouragement to repeat the operation under similar circumstances, for it seems clear to me that our first duty, imperative and unyielding, to which all opinions and feelings as to its desirability in any instance must yield, is to *prolong life and avert death.*

CASE II.—On Saturday, April 4th, 1874, I was sent for to



meet Dr. G. F. Jackson at Inwood, in consultation in the case of the child of Mr. K., a fully developed male infant, born at 11 o'clock Thursday night, being therefore at the time of my visit, 4 P.M., about forty-one hours old.

The child had had no passage from the bowels since its birth, and was beginning to suffer from distension of the abdomen, and vomited everything that was put into its stomach. The doctor had discovered at his morning visit that there was an obstruction just within the anus.

Upon examining the child I found a naturally formed anus. On introducing the finger it was arrested just within the anus, less than half an inch, by what seemed to be a firm, thick, fleshy obstruction, through which no sensation of fluctuation could be perceived when the child cried, or firm pressure was made upon the abdomen. It was readily brought into view by the introduction of a large-sized ear speculum, but no additional information was thus afforded, as it showed only a solid obstruction covered with mucous membrane, disposed in folds or rugæ.

The child had only passed urine once, and then in very small quantity, high colored, and with red sediment; there was no appearance of fecal matter in the urine, or in the material vomited.

The little patient was put under the influence of chloroform, and with the assistance of Dr. Jackson and Dr. L. A. Rodenstein I operated in the following manner:

An incision was carried from the posterior margin of the anus down to the coccyx, and through all the tissues of the perineum, enabling the parts to be drawn asunder, so that the dissection could be continued through the whole thickness of the obstruction, which proved to be considerable, for a depth of over two inches was penetrated before the intestinal pouch could be reached. When the intestine was found it was not very distinctly recognized as such at first, for instead of being fully distended it was only moderately so, but a small exploring needle being thrust into it brought away meconium in its groove; the opening was then enlarged with a hernia bistoury, and an attempt made to draw down the mucous membrane of the intestine, for the purpose of attaching it to the margin of the anus, but this could not be accomplished, for it was so high up and so firmly attached above that no force short of that which threatened to rend it would bring it even near the verge of the anus.

An injection of warm water was thrown into the bowel through an elastic tube, introduced into the opening in the intestine, and although some meconium was brought away, it by no means equalled in quantity what we expected; very little was discharged when the opening was first made.

At the conclusion of our proceedings the child seemed rather feeble, but not alarmingly so. Directions were given, should it live, for the daily introduction of the finger and soap bougies, to maintain the artificial passage. During the operation, the expediency of exsecting the coccyx, as recommended by some surgeons, was considered, but it did not seem, in this case at least, that anything would have been gained by it.

The child died at half-past twelve the same night, about seven hours after the operation; it had no pain, passed meconium in small quantities at intervals, and died quietly of shock, or exhaustion.

*Post-Mortem.*—Forty hours after death, appearance that of a well-developed healthy child; rigor mortis marked; solidification of subcutaneous fat gave a curious appearance and feeling to the surface, particularly in the posterior portions of the trunk, somewhat resembling the sclerema or solid œdema of infancy.

The diaper that was on the child had a stain of meconium upon it. Upon opening the abdomen, meconium was found in the peritoneal cavity. The surface of the intestines was perhaps more vascular than normal, but of this we could not be certain; aside from this there was no sign of peritonitis.

Before handling or disturbing the intestines the following notes were taken of their situation: The caput coli was lying in the left iliac fossa, from which point the large intestine did not pass upwards, but three times across the abdomen transversely, viz., from left to right, from right to left, and then from left to right again, making two complete turns upon itself, and terminating in the sigmoid flexure, which was situated on the right iliac fossa, from which point the gut passed downward and toward the median line, ending in an expanded cul de sac, which was firmly attached at the top of the sacrum and lower lumbar vertebra. On the anterior aspect of this cul de sac was an opening somewhat ragged and irregular, made by the operation; between this and a point less than half an inch from the anus there was no trace of intestine, not even a fibrous cord,

but a passage which had been made by incision through dense connective tissue, leading from the anus to the opening in the intestine. There was very little meconium in the large intestine, and what there was was accumulated in the cæcum, being apparently retained there by the abrupt bend of the gut; all the other abdominal organs were normal; no other cavity was opened. The child had hypospadias.

Of all the forms of malformation of the rectum and anus, that here described is, if not the most common, at least one of the most common forms. Its etiology is clearly to be referred to an arrest of development; the rectum being formed, as is well known, by two portions growing toward each other and finally coalescing to form a continuous tube. Arrest of development may take place at any point, being almost exclusively confined to the lower segment of the canal, and the point of its arrest determining the interval between the two approaching ends, or in other words the thickness of the septum. In this case the interval was remarkable for its length, and it is quite possible that abnormal development of connective tissue may have contributed to the production of the malformation; at any rate such a deposit existed.

The upper part of the intestine in these cases generally descends as low as to the top of the pelvis, if not further. It may be found floating free at the brim, or it may be situated laterally, a transverse portion of intestine crossing the brim of the pelvis. In this case it was found very firmly adherent, a circumstance at the same time unusual and unfavorable for surgical interference.

The surgical rule laid down by Amussat for the treatment of cases of this class, viz., having reached the intestine, to draw it down and attach it to the anal margin, is no doubt sound and correct. But however perfect and simple this may seem in theory, in practice it is by no means very easy to do in the best of cases, and in some is utterly impossible. When this is the case there remains nothing except the unpromising and hazardous expedient of opening the intestine, discharging its contents, and endeavoring to maintain the patency of the passage thus formed by the persevering use of bougies, etc., until such time as the tendency to contraction shall have been permanently overcome, and the new passage covered with a factitious mucous membrane.

This is indeed but little better than a forlorn hope, but Amusat was wrong in saying that no case could be cited in its favor, for many such are on record as having occurred before any other plan of treatment had been recommended; but of course it should never be adopted unless it is quite clear that the other and preferable method is impracticable. In my case the high position and firm adhesion of the end of the intestine made it quite out of the question; even after death, when the pelvis was freely opened, and the parts all more movable, it could not be done; how much less when working through the narrow perineum of a new-born child.

Owing to the preponderance of the large intestine, over the flaccid and empty small intestine in the fœtus and child at term, and the looseness of its attachment, great variations in its situation and convolutions are commonly met with.

Nevertheless it is rare to find such a complete transposition of the two ends of the gut as occurred in this instance, the cæcum being in the left iliac fossa, and the sigmoid flexure in the right.

Had inguinal colotomy been performed here on either side, the surgeon would have opened the part of the large intestine directly contrary to the one he intended; Littre's operation would have opened the caput coli, Huguier's the sigmoid flexure; and had the operation been done in the median line, as has been suggested, any one of the three transverse portions might have been opened; while a lumbar colotomy would have been in great danger of opening small intestine, or at any rate have reached the colon with great difficulty.

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## TREATMENT OF VASCULAR NÆVI WITH THE GALVANIC CAUTERY.

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 BY B. F. DAWSON, M.D., etc., New York.
 

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IN vol. iv., No. 3, November, 1871, of this Journal, I published a paper on the "Treatment of Vascular Nævi with the Actual Cautery," and related therein several cases in which the most satisfactory results followed that method of removal, or rather destruction; and having since operated many times in like manner, I still adhere to the views therein expressed of its advantages and gratifying results.

During the last two years, however, I have had opportunities of witnessing the use of, as well as using myself, the galvanic cautery in many operations in which it is "par excellence" the best means at the command of the surgeon. Having the requisite apparatus, I have used it many times for the destruction of nævi—in some of which other methods, excepting the actual cautery, had proved unsatisfactory—with unfailing success and most gratifying results.

As many surgeons still seem undecided as to the best means for removing this not uncommon congenital disease, many still adhering to the oldest and most unsatisfactory methods, I deem it not inadvisable to add my testimony in favor of a method that so high an authority as Dr. Maas, of Breslau,<sup>1</sup> pronounces to be followed by the best results, and to be much safer than the injection of iron or other coagulating fluid. This opinion he arrived at after having used the galvanic cautery in 112 cases with the following results: *Capillary nævus*—cured, 32; improved, 1. *Cavernous or venous nævus*—cured, 72; improved, 8; died, 3. *Arterial or racemose nævus*—cured, 2; improved, 1. *Nævus combined with other tumors*—cured, 6; improved, 1; result unknown, 2.

The galvanic cautery differs from the actual cautery in the means and facility for heating the needles, while it is superior to the latter from the fact that the degree and duration of the heat is wholly under control of the operator, and consequently

<sup>1</sup> Archiv für Klinische Chirurgie. Vol. XII., 1871.

it admits of being used with greater care and deliberation, while the actual cautery needles, readily parting with their heat, necessitate their hurried use. These advantages, combined with the admissibility of using very fine needles,<sup>1</sup> are the only advantages the galvanic can claim over the actual, for the effects of the two methods are precisely similar—destruction of the diseased parts by heat. Both methods have the advantage of allowing the destruction of nævi in parts of the body where it would be either unsafe or impossible to apply other means, as was the case in the third of the following cases which I have selected out of eight as best illustrating the advantages claimed for the galvanic cautery.

CASE I.—MARY O'Neil, one year and eight months, was brought to me February 17, 1873, with an irregular capillary nævus, the size of a bird's egg, situated immediately beneath the lower left eyelid. The history was as usual—that it was a small spot at birth, but had grown rapidly to its present size, and was a source of annoyance to the parents, as well as considerably disfiguring the child's face. The parents wishing its removal, the following day (18th) I singed it carefully, but thoroughly, with the galvanic cautery, throughout its whole extent, but not deeper than the cutis, so as to guard against unnecessary destruction of tissue, and consequent cicatricial contraction. Cold compresses were then applied and kept in place by a bandage. The next day there was slight consecutive inflammation of the adjacent tissue, very little swelling, and but very slight congestion of the conjunctiva. In a week after, all signs of congestion had subsided, and a thin scab covered the site of the nævus, which fell off on the twelfth day after the operation, leaving a healthy dark pink and soft eschar, showing no trace of the nævus, and not in the slightest contracting or impairing the mobility of the lower lid. Several weeks after, a slight discoloration was the only mark noticeable.

CASE II.—JESSIE B——, two years old, fine healthy child, was brought to me from Flushing, Nov. 21, 1873, by previous arrangement, to be operated on for a subcutaneous venous nævus

<sup>1</sup> The needles used are made of fine platinum wire, doubled like a hair-pin and then pinched tightly together. They need not be longer than an inch.

situated over the right eyebrow. Compression, collodion, and argent. nit. had been used by different physicians without result, as the disease continued to grow to its present size of about half an inch long by one-quarter wide. As in the preceding case, I singed the nævus thoroughly with the platinum needle at a red heat, a wet compress was applied, and the child taken home to Flushing the same afternoon. Five days after, I saw it at my office, and found a firm black scab covering the seat of the nævus. In a few days this scab fell off, leaving a healthy pink cuticle beneath, but at the lower angle a small dark spot showed that a portion of the nævus had escaped destruction. This was destroyed, in like manner, on Dec. 21st, one month after first operation. The result in this case has been perfectly satisfactory, for when seen on Feb. 24th last, the seat of the nævus could only be recognized by a small mark scarcely noticeable, and which the parents have recently informed me is gradually getting fainter. In this case I was assisted by my friends, Drs. Rankin, Porter, and Hanks.

CASE III.—Sarah Hawley, fourteen months old, was brought to me Feb. 21, 1874, at the Dispensary for Sick Children, with a subcutaneous venous nævus near the border of the upper right eyelid, and which considerably disfigured the child. The history was one of rapid growth to its present size of a large pea.

The mother stated that she had taken the child to the Eye Infirmary in this city, but that she was advised to have nothing done. On close examination I resolved to operate on the tumor, as from its very rapid growth it was evident that the whole lid would before long be involved, and its function being thus impaired, the eye itself would suffer. From the location and deep character of this nævus I could judge of no safe means of removing it excepting the galvanic cautey. Certainly it would have exposed the eye itself to injury to have attempted its removal by the potential caustics, vaccination, or coagulating injections, for the reason that the effects of these methods would extend beyond the actual site of the nævus, as their action is not wholly under control; the opposite is the case in using the galvanic cautey needle, with which it is possible to destroy slowly and cautiously, and only to the extent deemed safe in view of the consecutive inflammation.

On Feb. 24th, assisted by three of my students, I operated on the case, entering the naevus with the red-hot platinum needle at the lower border of the eyelid, which was held by forceps, and thus destroyed it subcutaneously by working the point of the needle cautiously to the right and left, avoiding going too deeply. The whole operation was completed within three minutes, and the child on recovering from the chloroform was removed to its home, a wet compress being previously applied.

I saw the child again on the 29th, when a firm scab covered the site of the naevus; there was also some congestion of the conjunctiva, but nothing very marked, and but little swelling of the lid. On March 3d I saw the case again and found the scab removed and a slight granulating spot remaining. The eye in all other respects looked healthy. When last seen, April 2d, nothing excepting a small scar showed where the naevus had been; there was no contraction of the lid, and the mother expressed herself highly pleased at the result. Certainly no better result could have been obtained by other methods of treatment.

These three cases may be considered as fully illustrating the superiority of the galvanic cauterity over other means for destroying naevi, and I feel confident that it will before long be universally considered one of the safest and most reliable means in the majority of cases for removing this so often disfiguring and sometimes dangerous congenital disease.

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#### PRELIMINARY REMARKS ON THE HYPODERMIC USE OF ERGOTINE.

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By PROF. HILDEBRANDT, of Königsberg, Prussia.

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KÖNIGSBERG, *March 22d*, 1874.

DR. PAUL F. MUNDE.

MY DEAR DOCTOR,—I shall be very glad to comply with your wish to give you my experience on the use of ergotine in fibroid tumors of the uterus for your Journal: only have a little patience until I can look over and arrange those cases which have come under my notice since the publication of my article, with which you are acquainted, in the *Berliner Klinische Wochenschrift*. For the present, I take the liberty of in-



forming you, that I still see as much benefit from the method as formerly, and do not intend to relinquish it. The patients frequently complain of severe pain, and some are compelled to retire to their beds an hour after the injection, and rest for an hour or two. In a number of other women I made the injections in my office, and they regularly went home *on foot* without any difficulty.

Abscesses I have never seen,—and during the past few years I have made personally several hundred injections of a full Pravaz's (hypodermic) syringe. I know, however, that my colleagues here have met with them several times, but I also know with equal certainty, that the canula in such cases was generally introduced too superficially. In two cases only in my clinic, the sensitiveness of the skin was so great, that in one patient after the tenth, and in the other after the twelfth, injection, which were made by my assistant, cutaneous abscesses arose.

In performing the injection I take up a firm fold of skin and insert the canula of the syringe perpendicularly (not obliquely) into the crest of the fold to the depth of one-half the length of the canula, in order that the fluid may always enter the thick, adipose, subcutaneous cellular tissue. I believe that it is owing to this circumstance alone, that I have never had occasion to see an abscess. As a rule, only the first three to five injections are painful; subsequently they are more and more easily borne. A slight subcutaneous infiltration (*Hautknoten*) always remains, in some women only several days, in others many days, and even weeks.

These short preliminary remarks will be followed in a few weeks by a more detailed article.

Until then I remain, yours very respectfully,

HILDEBRANDT.

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**EDITORIAL.**

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## CHANGE OF EDITORS.

HAVING for some time contemplated retiring from the editorship of this Journal, I now desire to inform the friends of the same that with this number my connection with it ceases. The reasons for this step lie in the fact that the attention required by the Journal occupies too much of my time, as also from a desire to retire from the arduous and often vexatious duties necessarily connected with the position of editor of so large a work, and of which I have had a large amount during the six years of the Journal's existence.

By many, doubtless, this journal is considered to have had unusual success, and to have escaped all the troubles that so often attend the publication of new medical journals. That the contrary has been the fact, and that it has attained its present success through much tribulation, will be seen by the following brief statement of the difficulties with which I have had to contend during the six years of its existence.

The first number was issued in May, 1868, consisting of 96 pages, the subscription price being \$3.00 a year. The failure of its publishers—Morehead, Bond & Co.—before the appearance of the third or November number, obliged me, in order to keep the Journal up, to buy their interests in it, and seek new publishers in Wm. A. Townsend & Adams, to whom the Journal was sold, and by whom it was published for about two years. Its success, when taken by them, warranted the increase of each number to 127 pages, and the price to \$4.00. With the second volume the numbers were further enlarged to 181 pages, and with the third volume to 190 pages, the price still remaining \$4.00.

The failure of Townsend & Adams, before the close of the third year, again forced me to purchase the Journal, and involved me in a protracted law-suit, and the loss of several thousand dollars.

With volume four Baldwin & Co. became the publishers

and the subscription was increased to \$5.00. Before the completion of the year this firm also dissolved, and for the third time I was obliged to seek new publishers, and was able to place it in charge of its present publishers, William Wood & Co., who have since managed it to the satisfaction of all.

With the present number (the first of the *seventh* volume and *seventh* year) William Wood & Co. also become its owners, having purchased my proprietorship of it, and will issue it in *its present improved appearance, as to type* and press-work, which is the best proof of the increasing success of the Journal. While the subscription remains at \$5.00, the use of smaller type has increased the amount of reading by at least 30 pages.

Dr. Paul F. Munde, who has been my efficient associate for the past year, and to whom I have long contemplated giving the entire management, will, with the future numbers, assume sole and entire editorial charge. That he will discharge the duties of the position with credit both to the Journal and himself, I am well assured, and as time will certainly prove, and I ask for him the same kind and liberal support in his work which it has been my good fortune to receive from the profession, and which I now most gratefully acknowledge.

Though no longer connected with the Journal, I shall watch its future with a truly "paternal" interest, and it will always be my pleasure to do whatever may help to increase its usefulness and further its interests.

To this end I have determined, with this year, to offer annually a prize of \$150, gold, for the best essay on some subject to be announced at the beginning of each year, and the conditions of which will be fully given in each number. The announcement for the ensuing year will be found after "CONTEXTS."

In retiring from my editorial duties I wish to acknowledge my indebtedness to my editorial confrères who have so uniformly and courteously encouraged me in my work, and also to accord a full share of whatever reputation the Journal has achieved to those to whom it most justly belongs—the distinguished contributors to its pages—and to ask the continuance of the same aid to its future editor that they have so generously and willingly extended to myself.

B. F. DAWSON, M.D.,

8 East 15th street, New York.

## TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

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REPORTED BY PAUL F. MUNDE, M.D., SECRETARY.

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STATED MEETING, JANUARY 6, 1874. THE PRESIDENT, DR. PEASLEE,  
IN THE CHAIR.

### CASE OF RUPTURE OF THE COLON OF A CHILD DURING REDUCTION BY TAXIS OF A PROLAPSE THROUGH AN ARTIFICIAL ANUS.<sup>1</sup>

DR. J. H. POOLEY, JR., presented the large intestine of a child upon which he had performed colotomy in the left inguinal region for congenital atresia and immediately after birth, about four years ago, and the history of which he had reported to the Society at that time. On December 8th last he was called to see the child, which had been doing very well since its birth, and found the mucous membrane of the bowel protruding through the artificial anus. With some difficulty this prolapse was reduced by taxis under chloroform at about 9 P.M., and the child appeared entirely relieved, but died suddenly towards morning. The autopsy revealed a rupture in the bowel near the artificial anus which, as had been supposed and intended at the time of the colotomy, was found to be situated in the region of the sigmoid flexure. There was slight peritonitis. The peritoneal surface of the intestines was of a dull pasty color, and there was but little serum in the peritoneal cavity. Colotomy could not have been performed on the right side in this case, for there was only small intestine found there, the cæcum being bound down by adhesions. The rupture of the bowel near the artificial anus was probably owing to taxis. There was no rectum, but a double communication between the bowel and the bladder and the bowel and the urethra direct. Dr. Pooley wished to ask whether the peritonitis which had so rapidly arisen could be owing to the taxis and the rupture alone, or whether it had existed previously.

DR. JACOBI said that it was impossible to use so much taxis as to rupture all three coats of a perfectly healthy intestine. Spontaneous rupture of the intestine will occasionally occur many years after an attack of typhoid fever; the intestine has become friable and inelastic by means of plastic exudation,

<sup>1</sup> See this number of the JOURNAL.

cicatrizization after old ulceration, old peritonitic remnants, cretaceous deposits, or chronic peritonitis, and suddenly ruptures without apparent cause or premonition. In Dr. Pooley's specimen the intestine around the rupture is not in a healthy condition, but brittle and friable, and the edges of the rupture are rounded; doubtless the lesion of the mucous membrane is of older date, and only a thin abnormal peritoneal coat has existed at the point of rupture for some little time. This was torn during taxis without any effort.

DR. CHAMBERLAIN asked whether intra-uterine peritonitis ever closes the intestine (colon or rectum).

DR. JACOBI answered that, if peritonitis did not, enteritis might, and occasionally did; hardly in the rectum, which grows together from above and below, but in other portions of the intestine, such as the duodenum; at least there are a number of cases which cannot be otherwise explained.

#### DIPHTHERIA AND CROUP.

DR. JACOBI presented a diphtheritic membrane from the nares of a child. The nares had been completely obstructed, and the membrane was removed by injections into the passages; it is large, cylindrical, and entirely corresponding to the configuration of the nares. These parts should be attended to, for there are not unfrequently cases of nasal diphtheria, accompanied by lymphatic swellings which, unless soon properly cared for, easily prove fatal. This is particularly the case this winter. Besides the laryngeal form, nasal diphtheria is the most dangerous. Dr. Jacobi disinfects the nasal and pharyngeal region very early, and thinks that as soon as swelling of the submaxillary and facial glands is present the nares are affected, and their disinfection should at once be commenced with. It is particularly in nasal diphtheria that blood-poisoning is a common cause of death. The injection used consists of two to four grains of carbolic acid to the ounce of water, which is mixed with glycerine to cause it to adhere better to the surface. The injections are made every hour, or less often, as occasion requires. When there are macerated deposits present he uses lime-water injections. The fluid is injected up the nares anteriorly from a blunt-pointed syringe to prevent injury to the mucous membrane.

DR. POOLEY asked whether these injections would not be useful in scarlatina.

DR. JACOBI answered, certainly, if there were pharyngeal trouble, diphtheritic membranes, or putrid angina.

In answer to Dr. Perry, Dr. Jacobi said that he relies mostly

on the above-mentioned injections as local treatment in nasal diphtheria, in which form, however, owing to the particularly rapid and violent participation of the general system through absorption by the lymphatics, general treatment, such as quinine and stimulants, is equally indispensable.

Dr. JACOBI further presented the larynx and trachea of a child, which died of croup in the practice of Dr. C. F. Rodenstein. The larynx, trachea and upper portion of the œsophagus were filled with diphtheritic membranes, which were easily detachable in the trachea and œsophagus, but firmly adherent in the larynx. When speaking of diphtheria and croup, we mean the same anatomical condition and structure, only in different localities.

In answer to a question by Dr. Peaslee,

Dr. JACOBI said: There are not two different forms of anatomical lesions in croup and diphtheria; in fact, membranous croup is nothing but laryngeal diphtheria, and we might as well drop the term "membranous croup" entirely, for it is only diphtheria which descends and assumes the characteristics of croup as it reaches the larynx.

#### OVARIOTOMY.

Dr. PEASLEE reported an ovariectomy performed by him about a fortnight previously. The operation was easy, there were some adhesions which were easily divided with the hand. The ligature to the pedicle was composed of four strands of silk waxed but not twisted, and so strong that no ordinary man could break it; it was applied over one inch from the divided end of the pedicle and was drawn as tight as possible—so tight that Dr. Peaslee was quite sure there could be no hemorrhage from the pedicle. The ligature was a double one, each half of the pedicle being ligated separately. The patient did very well at first, but began to sink after thirty hours, and died in forty-four hours. At the autopsy it was found that there had been hemorrhage from the left side of the pedicle, probably for twenty-four hours previous to death; about one pound of fluid blood was found in the abdominal cavity. The ligature had not slipped in the least; in fact, although both loops of the ligature were rather loose, the one on the side which did not bleed was rather looser than the one on the side which bled. Dr. Peaslee said that this was his eighty-eighth or eighty-ninth ligature of the pedicle in ovariectomy, there often being two ligatures used as in this case, and never did hemorrhage from the pedicle ensue, unless the ligature slipped before the abdomen was closed, when it was easily controlled by a new

ligature. He hardly knows how to explain the hemorrhage from the pedicle in this case; perhaps the fact, that the ligature was of finer silk than usual, had something to do with it, and a thicker ligature would have compressed the pedicle more tightly. He thinks the ligature of the pedicle the best safeguard against hemorrhage, only it must be the right kind of ligature; the one he commonly uses is composed of several strands of thick saddlers' silk. A clamp is very good, when the pedicle is long enough.

Dr. JANVRIEN suggested that Dr. Peaslee had forgotten to mention the peculiar fluid condition of the blood in the case just reported; so much so, that not the least sign of coagulation had taken place up to date in a specimen of about five ounces taken from the body.

Dr. PEASLEE said that he had not spoken of it, wishing to lay particular stress on the ligation of the pedicle, but that he was very much inclined to think that the hemorrhage from the pedicle, and consequently the death of the patient, were owing to the hypinotic condition of her blood.

In answer to a question by Dr. Chamberlain, Dr. Peaslee said that there was no danger of sepsis in leaving so large a stump above the ligature, for the pedicle speedily becomes organized by being attached to the intestines or other adjacent tissues.

#### CASE OF MANIFOLD CONGENITAL MALFORMATION.

Dr. JACOBI presented a very interesting specimen of congenital malformation of various kinds in a full-grown child born at term: Both hands are flexed; on the right side the thumb, portion of the carpus and the radius are absent, the forearm is unusually short. On the left side the fingers are adherent, and the third and fourth phalanges of the second and third fingers are constricted and almost amputated. On the left leg there is a sharp constriction around the calf, about half-way between the knee and the ankle. Several toes on both feet are adherent, and on the right foot the third toe is strongly constricted by a band going from the second to the fourth toe. All these bands are doubtless of amniotic origin, so-called "amniotic bands."

The head presents the spectacle of a double encephalocele, two bags originally containing brain-matter hanging over each side of the face. Most meningoceles occur through normal openings in the skull, such as the fontanelles; these protrusions, however, are through defects in the frontal bones. Of the roof of the skull there are present in this case: the occipital bone, a small portion of each parietal bone, and a slender ridge of fron-

tal bone dividing the two sacs, the remainder of the frontal bone having probably become absorbed by the pressure of the gradually developing herniæ. The right eye is well formed, the left eye imperfect. The central portion of the upper maxilla is also imperfectly developed. Owing to the lateness of the hour the more detailed discussion of this specimen was postponed to a subsequent meeting.

STATED MEETING, JANUARY 20, 1874. THE PRESIDENT, DR. PEASLEE,  
IN THE CHAIR.

#### CASE OF DOUBLE FOOTLING PRESENTATION.

DR. BUDD related a case from the practice of the late Dr. Underhill of this city, to which he was called in consultation. It was a footling presentation, and two feet, upon which traction had been repeatedly made without avail, projected from the vagina. Dr. Budd noticed that both feet were right feet, and thus discovered the cause of the dystocia; passing up the hand he brought down a left foot, and speedily extracted first one and then the other twin-child. Dr. Budd asked for the experience of the society on this question.

DR. NOEGGERATH said that he had read a case in a Berlin journal some four years ago, in which two right legs and two left arms had presented.

DRS. BUDD, NOEGGERATH and MUNDE offered remarks on fractures of the arm and leg during operative delivery.

DR. BUDD thinks, that in artificially delivering the arm, more attention should be paid to the fact, which is generally pointed out in the text-books, but often little regarded in practice, that the angle at which the scapula stands to the spinal column of the child will show whether the arm is placed before or behind the child, and thereby indicates the means and direction of delivery of that arm.

DR. NOEGGERATH mentioned the case of a woman, who was born with two fractures, had 32 additional fractures during her life, became pregnant, although her conjugate diameter measured only  $1\frac{1}{2}$  inches, and died after Cesarean section. The friability of her bony structure was owing to mollities ossium; the ilium was found to be so thin that printed matter could be read through it.

#### CASES OF TRANSFUSION.

DR. NOEGGERATH reported four transfusions made by him in chronic affections in two individuals.

The first case is that of a lady, 40 years of age, who suffered from excessive metrorrhagia, developed first after a miscarri-



age; she was so anæmic as not to be able to leave her room, her pulse was from 120 to 130 per minute. A microscopic examination of her blood showed the corpuscles to be hydropic, three times their usual size, a condition commonly met with in anæmia. Local treatment (she had a slight erosion of the os) produced but temporary amelioration. The first transfusion was made in May, 1870, with Dieulafoy's apparatus. The blood was taken from a young man, defibrinated, filtered, and warmed to 30° centigrade; one canula was introduced into the vein by as small an opening as possible, the stylet being withdrawn as soon as the coats of the vein were pierced, and the other canula was placed in the blood, which was then pumped into the vein. When about six ounces had been injected, the patient felt some pulmonary oppression, and no more blood was introduced. The effects of the operation did not develop themselves until a week later, when she was able to go to Dr. Noeggerath's office. She subsequently improved a great deal, and the menorrhagia had very much diminished. During the ensuing summer she had a relapse, in consequence of which it became necessary to repeat the operation in the autumn. The patient was then very low, and only four ounces were injected; she improved sufficiently to go to Europe, and Dr. Noeggerath has been informed that she is now doing well, and no longer suffering from her former malady.

The second case is that of a lady also, but does not come within the pale of gynecology, the disease for which transfusion was performed being splenic leucocythæmia, the object being to restore the patient sufficiently to admit of the subsequent removal of the spleen. The operation was twice performed with little benefit; the lady died while in Europe soon after the second operation.

Dr. Noeggerath said that in his opinion it is no advantage to pass the blood directly from the giver to the receiver. If properly done, there is little danger of injecting air into the vein during the ordinary operation; and even if air should enter it would do but little harm, unless the vein were near the heart.

DR. JACOBI related three cases of transfusion performed by him: One in a case of intestinal hemorrhage during typhoid fever; the patient recovered from the hemorrhage, but died of a relapse of the typhoid on the 50th day; one in nephritis and uremia, produced by the swallowing of 1½ ounces of chlorate of soda, no benefit; and one in a case of splenic and lymphatic leucocythæmia, with pulmonary tuberculosis. There is no result as yet, and in view of the tubercular complication, none to be anticipated. He used Eulenburg and Landois's apparatus, but does not like it, because the brass trimmings are

liable to oxidize and poison the blood injected or in the receiving vein. In the last case he used Dieulafoy's apparatus, which is much better; the canula similar to an exploring trocar should be used, a minute opening made in the vein, and the stylet then immediately withdrawn, leaving the canula in the vessel.

TWO CASES OF CROUP. RECOVERY OF A CHILD UNDER TWO YEARS OF AGE AFTER TRACHEOTOMY.

DR. JENKINS related two cases of croup in which tracheotomy was performed. He was called in consultation to the first case, a child 21 months old, on the tenth day; the temperature was  $99\frac{3}{4}^{\circ}$ , the pulse 160, the breathing difficult. There was no exudation on the tonsils. Laryngo-tracheotomy was performed under chloroform; as soon as the larynx was opened the child coughed up a quantity of membrane. The tube was removed on the 11th day, and the child made a perfect recovery, and was dismissed from active treatment on the 21st day. Some difficulty in deglutition was subsequently present during convalescence, probably caused by œdema of the glottis.

The second child was two years old; it was much relieved by the operation, but died from pulmonary œdema on the following day.

DR. BUDD asked Dr. Jacobi how many children under two years of age he had seen recover after tracheotomy for croup.

DR. JACOBI said that the results have always been bad, particularly this year, owing to the prevalence and extent of diphtheritic exudation. Up to the year 1868 there have been only eleven or twelve cases of recovery under two years of age reported; since then he has had one himself, and has heard of a few others; in all there may be hardly twenty published cases. He thinks that the difficulty in deglutition in the successful case reported by Dr. Jenkins was owing to a slight diphtheritic paralysis, rather than to œdema of the glottis, since it came on as late as four weeks after the termination of the disease.

STATED MEETING, FEBRUARY 3, 1874. THE PRESIDENT, DR. PEASLEE, IN THE CHAIR.

THE INDUCTION OF PREMATURE LABOR. REPORT OF THIRTY-FOUR CASES.

By invitation of the President, DR. LEWIS A. SAYRE, who was present as a guest, related the case of a lady upon whom the induction of premature labor had been performed three times,—twice at the middle of the seventh, and the last time at the beginning of the eighth month. The first operation is re-

ported as case 76, in Dr. George T. Elliot's book. The first labor in 1863 was a very difficult one—the head being impacted; craniotomy was performed; an abscess formed in the right groin and was opened, as a result of which a large, indurated cicatrix remained in the right side of the pelvis, whereby the diameter of the latter was materially diminished. For this reason the induction of premature labor was decided on for the next confinement, which occurred in 1866, when the operation was performed at seven and a half months; and by the use of the hot douche, Barnes's dilators, and the introduction of a piece of flexible catheter outside of the membranes, labor was induced, and a living male child, weighing seven pounds, was delivered forty-eight hours after the first douche. In March, 1871, labor was again induced at seven and a half months, likewise by means of the hot douche and the flexible catheter, aided by several doses of quinine of six grains each, and a living female child, weighing six pounds, was born about sixty-two hours after the first douche. In December, 1873, labor was induced for the third time at the beginning of the eighth month by the hot douche, flexible catheter, and Barnes's dilators (one of which was burst by the uterine contractions), and a living child, which when dressed weighed eight pounds, was delivered with the forceps one hundred and ten hours after the first douche. The mother and all the children are alive and in good health.

DR. JENKINS related two cases in which he induced premature labor. In the first case the first four children had been born dead, probably owing to their size, which was eight, nine, nine and a half, and ten pounds respectively, and the indication for the operation was, in a measure, in accordance with the rule, that the child increases in size corresponding to the increase of age of the mother below the fortieth year. Labor was induced by means of the elastic catheter about the middle of the eighth month; after twelve hours a live, healthy child was born. The second case was in the thirty-sixth week, the indication convulsions, the instrument used Barnes's dilator of the largest size; the os dilated very rapidly, the head presented, version and extraction were performed. The mother recovered from her confinement, but was seized with puerperal mania, from which she is still suffering.

DR. L. A. RODENSTEIN mentioned two cases in which convulsions were the indication. Chloroform was given, and Barnes's dilator introduced; the labors were both short, and living children were born.

DR. PERRY has always used Barnes's dilators with perfect satisfaction. He related the case of a lady, nineteen years of

age, who suffered from excessive nausea and vomiting during her first pregnancy, until she became so debilitated, and the foetal heart-sounds grew so weak, that it was decided, at the suggestion of Dr. Elliot, to induce premature labor at the middle of the seventh month. The uterus was low, the os open, the mucous plug already lost, and the fingers could be easily passed up to the membranes and swept around, which was done until pains commenced and the membranes began to pout; when the manipulation was discontinued the pains also ceased. At the suggestion of the mother of the patient, who had been treated in the same manner by Dr. Perry's father, Dr. Perry gave aether with the intention and result of increasing the pains; twenty minutes later the child was born; it lived five days; the mother recovered.

Dr. WARD gave a sketch of seven cases in which he induced premature labor: in two the indication was puerperal convulsions, in three contracted pelvis (one of which conjugate 3'', two of the mothers died), in two placenta prævia. The means used were the catheter, Barnes's dilators, once a dried pig's bladder, and the warm douche. The labors were rapid; in two cases of contracted pelvis, the child was extracted with the forceps.

Dr. WALKER reported a case at the end of the eighth month. The nozzle of a syringe was introduced into the cervix and warm water injected with slight pressure. When the os was of the width of a Spanish dollar, a catheter was introduced to the depth of 6'' without producing pains until sixteen hours after, when a live healthy child was born, which died in twenty-four hours, probably owing to neglect of the mother.

Dr. Lusk related a case of oblique pelvis, in which he induced labor at the beginning of the twenty-ninth week. The warm douche was applied every two hours for thirty-six hours, without any effect; he then attempted to introduce Barnes's dilator, in which attempt he eventually succeeded, although the soft, movable condition of the cervix rendered it very difficult. The os was gradually dilated, and version according to Braxton Hicks performed; the child lived a few hours. The ischiatic diameter measured one and one-half inches.

Dr. NOEGGERATH said that the results of the induction of premature labor in this country are much more favorable than in Europe, as is illustrated also by the seventeen cases related by the members present this evening. He has no doubt that the results are much more favorable since the introduction of Barnes's dilators, which have generally been used in this country, and to this circumstance must be ascribed, at least in part, the favorable results here. He read short accounts of seventeen

No.	Name.	Date of Confinement.	Month of Delivery.	Indication.	Presentation.	Method of Operation.	Duration of Labor.	Result for Mother.	Result for Child.	Remarks.
1	Mrs. R., 34th street	April, 1870	Beginning of 8th month	Contracted pelvis.	Vertex.	Barnes's dilator, elastic catheter.	Catheter introduced at 9 A.M., os dilated from 4 to 6 P.M.	Recovery.	Born alive, died next morning.	Severe instrumental labor after first confinement.
2	Mrs. K., 38th street	Aug., 1861	Second half of 7th month	" "	"	Krause's method.	22 hours.	"	Living child, continued to live.	Two dead children in previous confinements.
3	Mrs. Levy, 8th Ave.	March, 1870	Beginning of 8th month	" "	"	Barnes's and Krause's.	Catheter at 8 A.M., dilator at 5 P.M., finished at 7 P.M.	Recovery after endometritis.	Child died next morning.	Two severe instrumental labors.
4	Mrs. M., 8th Ave.	June, 1856	Beginning of 8th month	Rhachitic pelvis conjugate $2\frac{3}{4}$ "	"	Cohen's.	24 hours.	Recovery.	Living child.	Cranotomy in last labor.
5	Mrs. L., 6th Ave.	June, 1858	3 weeks before 8th month	Rhachitic pelvis conjugate $3\frac{1}{4}$ "	Cross.	Cohen's, version, forceps.	20 hours.	"	Still-born.	Forceps twice before.
6	Mrs. P., 7th Ave.	Sept., 1871	Middle of 7th month	Oblique contracted pelvis.	"	Barnes's, version, forceps.	10 hours.	Recovery after slight endometritis.	Child lived a few hours.	Forceps in first confinement.
7	Mrs. N., Sullivan st.	July, 1858	Sixth month	Chronic nephritis, anasarca.	Vertex.	Cohen's.	16 hours.	Recovery.	Not viable.	Eclampsia after last labor.
8	Mrs. P., 8th Ave.	June, 1870	End of sixth month	Acute nephritis.	"	Barnes's, version.	$1\frac{1}{2}$ hours.	"	" "	
9	Mrs. L., E'way East 16th st.	April, 1867	2 weeks before term	Nephritis, eclampsia.	"	" "	1 hour.	"	Living.	
10	Mrs. B., Jersey City	May, 1869	End of fifth month	Chronic nephritis, uremia.	"	Barnes's.	$1\frac{1}{2}$ hours.	"	Not viable.	
11	Mrs. R., 1st street	Feb'y, 1863	End of eighth month	Chronic nephritis, eclampsia.	"	Barnes's, version.	2 hours.	"	Lived a few hours.	
12	Mrs. T., West 49th st.	Sept., 1870	End of sixth month	Acute nephritis, eclampsia.	"	Barnes's.	1 hour.	Death from hemorrhage 6 hours after delivery.	Not viable.	
13	Mrs. P., East 16th st.	June, 1871	Beginning of 8th month	Softening and loosening of symphysis pubis.	"	Barnes's, version.	9 hours.	Recovery after endometritis.	Living, died in 1 week.	
14	Mrs. L., West 14th st.	Jan'y, 1860	Fifth month	Multifollicular ovarian cyst, incarcerated between uterus and sacrum, threatening peritonitis.	"	Krause's.	18 hours.	Recovery.	Not viable.	
15	Mrs. B., East 41st st.	March, 1861	Sixth month	Carcinoma uteri, hemorrhage.	"	Krause's.	24 hours.	"	"	
16	Mrs. F., West 17th st.	Nov., 1866	Third month	Uterus strangulated between ovarian cyst and os sacrum.	—	Compressed sponge.	70 hours.	"	"	
17	Mrs. E., Avenue A	Nov., 1873	Beginning of 8th month	Acute hydraunitis, metritis.	Vertex.	Puncture of membranes.	8 hours.	"	Twins, died within 24 hours.	

cases in his own practice, in six of which the operation was performed for contracted pelvis, in six for acute nephritis, uræmia, and eclampsia, in one for softening and loosening of the symphysis pubis, in one for a multilocular ovarian cyst incarcerated between the uterus and the os sacrum, in one for hemorrhage from carcinoma uteri, in one for strangulation of the uterus between the os sacrum and an ovarian cyst, in one for acute hydramnios and metritis. In nine cases labor was induced with Barnes's dilator, in three with Cohen's method (injection of warm water into the uterus), in three with Kransé's method (introduction of an elastic catheter between the uterus and the membranes), in one with the compressed sponge, and in one by puncturing the membranes. The average duration of the labors was about fourteen and one-third hours. All the mothers recovered, with the exception of one who died from hemorrhage six hours after delivery. Of the children ten were born living (of these six died after a few hours or days, among them twins), seven were non-viable, one was still-born. The accompanying table contains further details of these seventeen cases.

STATED MEETING, FEBRUARY 17, 1874. THE PRESIDENT, DR. PEASLEE, IN THE CHAIR.

SPECIMENS OF FIBROID POLYPI AND OVARIAN CYSTS. A NEW APPLICATION OF HYDROSTATICS IN THERAPEUTICS.

DR. CHAMBERLAIN presented two uteri with small fibroid polypi springing from the fundus; also one specimen of an ovarian cyst which had obliterated the whole stroma of the ovary, and another in which the cyst projected from the surface of the ovary. The external os of one of the uteri was a perfectly circular exceedingly small opening, like a puncture. There were no histories to the specimens, since they came from the dead-house.

DR. J. H. POOLEY, Jr., mentioned the case of a woman, 45 to 46 years of age, with a urethro-vaginal fistula, in whom after the cure of the fistula no vaginal portion whatever could be detected. He wished to ask how often and at what age this atrophy of the cervix occurs.

DR. PEASLEE said that, if the fistula is situated in the cervix, during cicatrization after operation the vaginal portion may be so drawn out of sight as to appear atrophied. He has seen several cases of atrophy at or near the 50th year.

In relation to the appearance of the external os of the uterus presented by Dr. Chamberlain, which evidently belonged to a nulliparous woman, he would suggest that, in contradistinction to the term *nulliparous* to designate a woman who has borne no

children, the term *parous* be used to indicate a woman who has borne one or more children, in place of the terms *unipara*, *deutipara*, *multipara*, etc., now in use.

Dr. CHAMBERLAIN asked, whether such a constricted condition of the external os would not be a sufficient cause for endocervicitis.

Dr. PEASLEE said that such was decidedly the case, as a narrow meatus occasionally was also the cause of gleet in the male. He always dilates the external os in unmarried women who suffer from uterine leucorrhea.

Dr. Chamberlain also exhibited a new apparatus devised by himself for the application of cold to different parts of the body, such as the eyes, the larynx in croup, the joints and limbs generally, etc. The apparatus consists of rubber tubing of various sizes, folded and connected by gauze or flexible wire in the desired shape, or simply wound around the limb and retained in place by wire clamps. The object is to apply continuous cold with progressive change of temperature, and this is attained by allowing a constant stream of water at the desired temperature to pass through the tubing, the rapidity of the current being regulated by the height at which the vessel from which the water proceeds is held, and by a stop-cock in the tubing leading to the patient. It is not necessary that the application of cold should always be that of ice in order to reduce inflammatory swelling; it is preferable rather, if the application is to be made for some time, to use water at a more moderate temperature, such as 50° F.

REPORT ON THE OVARIES REMOVED BY DR. T. G. THOMAS.  
("NORMAL OVARIOTOMY.")

Dr. NOEGGERATH read a detailed account of the macro- and microscopical examination made by him of the two ovaries removed by Dr. Thomas several months ago. The ovaries are of normal size, covered with numerous fine thread-like adhesions and filaments. Under the microscope both ovaries were found to be in a high degree of interstitial inflammation and fatty degeneration, the Graafian follicles partly obliterated and partly filled with hemorrhagic clots. A number of bodies similar to and probably Pacinian corpuscles, with what appeared to be nervous filaments leading to them, were found in the ovaries, from the whole appearance of which it was evident that no treatment short of removal would have been of service.

In answer to a question from Dr. Jacobi, as to what he would infer from the Pacinian corpuscles in the ovary, Dr. Noeggerath said that he did not draw any inference therefrom, except that there was fatty degeneration and the formation of new nerve-

tissue. Pacinian corpuscles have been stated to have been found once in a hypertrophied cervix uteri, but there is no literature on the subject. He attributes the constant and agonizing pain experienced by the patient in the ovaries not to the fatty degeneration, but principally to the inflammation of the peritoneal envelope of the organ and the consequent cicatricial contraction. This perimetritis may have been present since childhood, for he has seen a case in a child two and a half years of age.

DR. PEASLEE thought that, irrespective of the Pacinian corpuscles, there was enough found in the ovaries to account for the distressing symptoms. As a rule, a woman who has had children will bear more pain in the ovaries, and think less of it, than a virgin, in whom these cases of interstitial oophoritis are rarer than in married women.

DR. JACOBI said that interstitial oophoritis is more common in women subject to frequent sexual excitement, such as street-walkers.

#### CASE OF MYXOMA OF THE BREAST.

DR. NOEGGERATH presented a tumor taken from the breast of a woman. The patient had had pain in one breast for some time, which was increased by accidental pressure, usually disappeared at night, beginning again in the morning and increasing towards evening. Unusual warmth and excitement also augmented the pain. Above the nipple a small tumor of the size of a lentil was detected, which Dr. Noeggerath thought to be a glandular neuroma and the disease therefore neuralgia of the mamma. Local treatment was without avail. Three months later the tumor had increased to the size of a large bean. Dr. Noeggerath advised its removal at this early period the more, because the mother and aunt of the patient had died of cancer of the breast. After the superficial cutaneous incision it was difficult to find the tumor, since it could hardly be distinguished from the surrounding fat and gland-tissue, a portion of which had therefore to be removed with the tumor, which when fresh was of a red congested color. He thought it was a carcinoma, but on incision found it to be a myxoma, filled with thick, ropy mucus. If myxomata occur in homogeneous tissue they are benign; if in other, that is in tissue which is not originally fat-tissue, they are very apt to become malignant. The myxomatous cells in this case are not developed in the fat-tissue, but in the ends of the milk-ducts; therefore, since the original structure is degenerated only by the formation of myxomatous matter, and the tumor is thus homologous, it is not likely to prove malignant.



## TRANSACTIONS OF THE PHILADELPHIA OBSTETRICAL SOCIETY.

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REPORTED BY JAMES V. INGHAM, M.D., SECRETARY.

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STATED MEETING, AUGUST 7, 1873. DR. W. GOODELL, PRESIDENT, IN THE CHAIR.

### A SPECIMEN OF SENILE UTERUS.

DR. BEECHER exhibited the uterus of a woman 89 years of age. This uterus was very small, and contained in its cavity a small quantity of a dark-colored fluid. The vaginal portion of the cervix was absent.

DR. J. V. INGHAM referred to the relative proportion of the neck and body of this uterus. In an infantile uterus the length of the neck is about two-thirds of the length of the entire organ. In this case it is about one-half—so that it is restored to the condition of childhood—in fact, the condition of second childhood.

DR. GOODELL saw two points of interest in the specimen. The first was the presence of fluid in the cavity of the uterus. This explains the cause of painful leucorrhœa in old persons. In them the discharge is often suspended for a few days, and then escapes with a gush. This is on account of the senile contraction of the internal os. He had found at times more difficulty in the passage of the sound in senile than in anteflexed or retroflexed uteri.

Another point of interest was the effacement of the vaginal portion of the cervix through atrophy. In child-bearing women of 30 or 40 years of age, the same effacement will occasionally happen from the stripping off of the vagina from the cervix through the upward traction of the womb during pregnancy and labor. This makes the adjustment of pessaries difficult.

DR. INGHAM presented to the Society a collection of obstetrical instruments—a donation from Mr. Gemrig for the Museum.

### CASES OF PUERPERAL ECLAMPSIA.

DR. R. H. CLEEMANN then read a history of a case of puerperal eclampsia—(see page 575, vol. vi.).

DR. INGHAM suggested that the convulsions in some puerperal cases may be due not to uræmia, but to brain lesions, and instanced a case of a woman dying from puerperal convulsions in the wards of the Philadelphia Hospital, in whose brain a large serous cyst was found.

DR. GOODELL asked Dr. Cleemann to what he attributed the fatal termination of his case.

DR. CLEEMANN replied that he thought it was due to effusion, either serous or sanguineous, into the medulla oblongata, for the respiratory function ceased first. He thought that many similar cases of sudden death were due to the same cause.

DR. GOODELL thought that the unilateral character of the attack and its duration showed that the disease was hemorrhagic, rather than serous in character. He considered the case an apoplectic one, and the effusion blood, not serum.

DR. ELLWOOD WILSON remarked that it was well to bear in mind the excitement under which the patient labored previous to the second attack.

DR. CLEEMANN said that he had attributed these symptoms to puerperal mania.

DR. GOODELL related the history of an attack of puerperal eclampsia, recently occurring in a primipara, 20 years of age.

She was seized with a violent headache, and as she had partaken of green corn, her physician administered an emetic, following it with bromide of potassium. That evening she had thirteen convulsions. Opium was given with the result of checking the convulsions for two hours. Next morning Dr. Goodell saw her. Her face was puffy and extremities œdematous. The pulse was so feeble that he did not use the lancet. He found, on examination, that the os would barely admit one finger. Upon consultation it was decided to deliver the patient. He therefore introduced Barnes' dilators at 7 o'clock, and at 10 put on the forceps and delivered the child. The patient never rallied from the condition of stupor, and died. His experience in these cases had led him to believe that ether could not be given in sufficient doses to control completely the muscular movements, induced by any artificial assistance. Chloroform, however, was not open to this objection, and he therefore preferred its use. Before delivery he had drawn off ten ounces of urine, which, upon testing, was found to be only slightly albuminous. In these cases the question always comes up whether or not labor should be induced or urged on. If the woman were near to term, if she were œdematous, if the convulsions were frequent, he would bring on labor. Usually labor is induced by the violence of the convulsive movements.

Should we leave the initiative to nature or not? This was often a most puzzling question.

DR. ELLWOOD WILSON had no fixed rules in these cases. He had recently brought on labor at the eighth month of gestation, and after five days the patient was delivered without accident. The urine of this lady always became albuminous, and was reduced to the amount of six ounces in 24 hours. He thought it desirable in this case to induce premature labor. The child lived for twenty-one days. He did not, however, give this example to establish a rule of action, but he thought he was justified in his conduct by the circumstances of the case. As a rule, he does not hurry on the labor.

Another case, which he had seen with Drs. Meigs and Pepper, a young woman of twenty-one years, was seized with convulsions at ten o'clock at night. They occurred with great regularity at intervals of twenty minutes. At ten and a half next morning he commenced delivery, perforating the child's head with great difficulty. After delivery, which occupied one hour and a half, the convulsions recurred at first fifteen, then ten, minutes apart, until the patient died.

DR. WILSON had had no difficulty in keeping patients under the influence of ether. He had seen a case kept under the use of ether three days and three nights. He referred to the case of a cook, seized with a convulsion in her kitchen. She had sixty-five convulsions and was then bled, after which she had sixty-six more. She was then placed under the influence of ether with relief. On the thirteenth day she went back to her work. He did not believe that chloroform is a safe remedy. The brain is too much oppressed under its use, and the sedative effect is too profound.

DR. GOODELL remarked that the weight of authority was against the induction of premature labor, but was in favor of helping on the labor when once begun. With regard to ether, he stated that he had found it quite equal to the control of the convulsions, but not to that of muscular resistance, whenever the hand had to be passed into the vagina or into the womb.

DR. INGHAM asked what guide could be had to indicate to us when to bleed, other than the condition of the patient's pulse, etc.

DR. WILSON replied that the great majority of these cases are in primiparae. The age, fulness of pulse, and flushed face, will warrant us in bleeding. He bled, as a rule, and thought that the patients were generally relieved by the operation.

DR. GOODELL agreed with Dr. Wilson. An early, timely, and full bleeding, he thought invariably relieved intracranial pressure, whether caused by an effusion of blood or of serum.

The tendency of the profession, during the last ten years, is toward depletion, if not as a curative, at least as a provisional, measure.

DR. INGHAM remarked that the point seemed to depend upon the cause of the convulsions; whether they were in consequence of the hydræmic condition of the blood, with œdema of the brain, or the result of uræmic poisoning.

DR. WILSON remarked that in the seventy-five cases which he had seen, albuminuria was never absent. The proper way is to cure the albuminuria. It is therefore the duty of every physician to examine the urine of his pregnant patients.

STATED MEETING, HELD OCT. 2, 1873. DR. WM. GOODELL, PRESIDENT, IN THE CHAIR.

#### CASES OF CONGENITAL MALFORMATION.

DR. INGHAM exhibited for Dr. Allison a fœtus of about four and a half months, with the cord wound once around the right thigh, making a deep groove in the integument. Had the fœtus lived to maturity it would undoubtedly have been born with a congenital deficiency of the right leg. He also presented the ovaries taken from a woman of about 60 years in age, in one of which an apparent corpus luteum of pregnancy was present.

DR. CATHCART exhibited a man with congenital deficiency of the hand. All the bones of the wrist were present, and two nodules of bone representing the fingers. On motion of Dr. Jenks, a committee was appointed to secure a photograph and report upon the case. Drs. Cathcart, Packard and Willard were appointed on the committee.

#### QUININE AS AN OXYTOMIC.

Dr. Packard related the following case: A lady had been confined twice; both labors tedious, the shortest thirty-six hours long. Three weeks before the expected time of a third confinement she contracted a cold, for which he gave her quinine, six grains per day. Thirteen days before time he was again sent for, and found the patient in labor. Two points here suggest themselves: first, would any quantity of quinine produce labor? second, would so small a quantity? On examination the os was not dilated, though some water had come away. At 10½ P.M. he was sent for, and found the os sufficiently dilated to admit the fingers.

No change took place for the next two hours.

At 2 o'clock Squibb's ether was given, the patient taking it

herself. At 3.20 minutes the child was born, and the placenta delivered.

As in this case the ether had the effect of dilating the os uteri, this fact is opposed to the idea advanced some years ago, that the administration of anæsthetics lessened the expulsive pains. He thought this case showed that ether will in many cases positively promote the expulsive powers of the uterus.

DR. A. H. SMITH had used quinine in patients exposed to miasmatic influences in amounts of twelve to twenty-four grains daily, and had never seen any uterine action set up previous to labor. After labor has begun, then it may act as a stimulant, precisely as other stimulants. He had seen the uterine contractions increase in frequency and intensity, but not to any greater extent than we would have from the use of any diffusible stimulant. He had seen no tendency in quinine to produce premature labor.

DR. PACKARD referred to the different susceptibilities of people to the use of quinine. With some, cinchonism is produced by a few grains. There may be peculiarities also in regard to the uterus.

DRS. TAYLOR and YARROW expressed similar views in regard to the use of quinine. They never hesitated to give it to their pregnant patients when needed.

#### THE USE OF ETHER DURING LABOR.

With regard to the action of ether, Dr. Smith remarked that many cases present a condition of spasmodic contraction of the neck of the uterus, in which anæsthetics have an admirable effect. In these cases labor goes on with violent contractions, and the os uteri will not relax when the head presses upon it. Here ether will be of service by its property of inducing relaxation.

In other cases he thought that ether retards labor by enfeebling the power of the patient. In multiparæ, where the os is in a yielding condition, there is no reason to expect delay from that source; hence ether retards labor by impairing the voluntary contractions which are so useful. The patient cannot bear down, because consciousness is impaired and volition is absent. If the patient insists, we may use ether as a placebo, only upon condition that she will bear down.

The prolonged use of ether will impair the vitality of the fœtus. He had rarely seen a case in which the use of ether was prolonged, in which the child did not require some effort to revive it.

DR. GOODELL remarked that ether is of value in the first

stage of labor in those cases in which the edge of the os is like a sharp knife, and so painful that the patient will shrink from the touch, and shriek out at every pain. In the second stage ether retards labor, and should not, as a rule, be given, except in such cases as an occipito-posterior presentation, where the pain is often intense and the woman unmanageable. He thought at one time that ether was a relaxer of the perineum. He does not think so now. The woman's pains are its best relaxers.

There is a liability to post-partum hemorrhage after the use of anesthetics. The British journals are full of bad and even fatal cases of post-partum hemorrhage, due, he thought, to the almost universal use in that country of anesthetics in labor. Severe flooding was in this country an unusual occurrence; death from it, extremely rare.

In regard to the use of quinine, Dr. Goodell had seen few cases in which he could trace increased uterine action to it. This idea of the uterine action of quinine is not confined to the physicians in this country. In Turkey and Greece, where ague is prevalent, the popular idea is that abortion is brought on by the administration of quinine. He thought that in these cases the abortion is the result of the muscular succussion, and visceral congestions of the disease, and not of any uterine action on the part of the antiperiodic.

DR. PACKARD recognized the thin, knife-like edge of the os uteri as an indication for the use of ether, and in other cases agreed with Drs. Smith and Goodell.

STATED MEETING, HELD NOVEMBER 6, 1873. DR. WILLIAM GOODELL,  
PRESIDENT, IN THE CHAIR.

#### CASE OF PUERPERAL SEPTICÆMIA.

DR. INGHAM exhibited the uterus and its appendages of a patient who had recently died from puerperal fever in the wards of the Philadelphia Hospital. The history of the case was interesting from its lack of similarity to the other cases of puerperal fever that the doctor had seen in the same wards. From the commencement, two days after labor, the tongue was dry and brown, the intellect was clouded, the temperature varied irregularly from  $101^{\circ}$  to  $104^{\circ}$ , and did not always accord with the rapidity of the pulse. The case had been treated with quinine, turpentine and Dover's powders. She, however, died on the eighth day. The post-mortem examination, made 32 hours after death, did not reveal any cause of death, except some general peritonitis. There was an ulcer at the posterior four-

chette of the vulva, the seat of a grayish, diphtheritic-like exudation. The peritoneum around the uterus and ovaries was somewhat congested, but there was no parametritis. The brain was congested; the liver, kidneys, and heart were fatty.

This seemed to be a case of puerperal septicæmia, without any special local lesion.

Dr. JENKS remarked that this case was evidently one of septicæmia. It serves to explain the cause of some cases of sudden death after labor. In these cases this condition of extreme fatty degeneration is always found to exist. The attention of pathologists being drawn to this fact, the uselessness of the treatment of this form of puerperal fever by intra-uterine injections is evident. He had seen many cases in which the uterus was perfectly healthy, while, in others, false membranes lined its cavity. It was evident that, in the case before him, the septicæmia had its origin in the local ulcer.

#### REPORT OF AN EPIDEMIC OF PUERPERAL FEVER.

Dr. J. S. PARRY remarked that the present epidemic of puerperal fever appeared in Blockley Hospital four years ago, the first case occurring Jan. 15, 1870. It has been characterized by diphtheritic deposit about the vulva, vagina, uterus, and sometimes on other portions of the body. This deposit places itself upon slight abrasions or injuries occurring during delivery to the fourchette or posterior portion of the vaginal wall. The deposit is generally greater than in the specimen presented, sometimes lining the entire vagina and uterus.

In inflammations, not puerperal, as well as puerperal, we are almost always likely to have involvement of the parts around the uterus. We have intense pain about the lower part of the abdomen. If the uterus be examined, it will be found large and tender; from this point the swelling extends above the uterus, and involves the entire peritoneum.

This case differed from those which had occurred previously in the wards. At the outbreak of the epidemic it was associated with pneumonia and relapsing fever, then prevailing in the hospital. In the first stage of the disease, the tongue was covered with a whitish fur, but with a clean tip; in the second stage the tongue became dry, brown, the fur coming off in flakes. This case again differed in some particulars of temperature. Generally in this epidemic the temperature rises rapidly to 105° or 106° in a few hours. The temperature falls alike in good and bad cases. In unfavorable cases it falls rapidly before death, as if the patient was going to recover, and if this fall is not accompanied with other favorable symptoms, it por-

tends death. The first indication of health is the morning remission; that gradually increases until it is like that of a quotidian intermittent. The tendency is then for the temperature to fall below the normal standard, to  $97^{\circ}$ . Sometimes there is collapse. In Dr. Ingham's case there was stupor.

The first case attacked at Blockley in 1870, was seized with acute puerperal mania, as was supposed. She died. It was found to be violent peritonitis. In four other cases he had noticed fierce delirium. This, however, is by no means characteristic of the disease. There is nothing more sudden than the changes in the condition of these women. In the morning they are cheerful and smiling, and seem to be well, yet they are consumed by fever; pulse rapid, features pale and shrunken, and death is written upon their foreheads. They sink and die without a struggle.

With regard to the treatment, Dr. Parry remarked that he had tried faithfully chloral, the sulphites, quinia, and all of the zymotic agents, and he relies upon the administration of opium in enormous doses, if necessary. One woman took  $1\frac{1}{2}$  grains of opium every two hours for several days. His experience with intra-uterine injections induced him to abandon them entirely. They seem to increase the local trouble and pain, and have been of no benefit whatever.

Dr. INGHAM remarked that this was the first case in which he had seen the brown tongue. In several other cases the tongue had a uniform triangular space, at the tip free from deposit.

In all his cases, the temperature seemed to be controlled by large doses of quinia.

In one case in which the morning temperature was  $103^{\circ}$  and evening  $102^{\circ}$ , the administration of quinia and Dover's powder reduced the temperature from  $103^{\circ}$  to  $101^{\circ}$ . In this case up to six weeks there had been no change in the character of the tongue. Whenever the quinia is cut down the temperature rises. The other cases present the same general characteristics.

Dr. LUDLOW asked whether the larger doses of opium produced sleep or merely relieved the pain.

Dr. PARRY replied, both. He had two cases at one time, who breathed, the one, four times per minute, and the other, six. Both responded to pressure upon the uterus. They both recovered.

Dr. WM. GOODELL thought that too little regard was paid to the distinction between the autogenetic and the heterogenetic forms of puerperal disease. Hence the discrepancy of different observers in respect to the symptoms, course, and treatment. In the first class, the woman is poisoned by her own lochia. But,



since these discharges become gradually offensive, and that not until many hours have elapsed after delivery, by that time the lesions of labor have begun to suppurate. But granulating surfaces are weakly absorbent; hence the poison is received into the system by small instalments, and these cases are therefore more manageable. On the other hand, in the heterogeneous variety the poison, in a high degree of intensity, is brought from without in direct and early contact with raw surfaces, while they are fresh, and, therefore, actively absorbent. This constituted a very fatal form of puerperal fever. He asked Dr. Parry how the women in the lying-in ward of Blockley were washed. In the Preston Retreat no epidemic of puerperal fever had yet taken place. This he partly attributed to the rule, that every woman is required to wash her own person, and that with a wad of oakum, which is immediately afterwards thrown away. He further made the patients get out of bed every day after the first, and sit in a chair while her bed was being made up; this facilitated the discharge of the lochia or of the clots which collect in the upper part of the vagina. By these means he believed that both the intrinsic and extrinsic sources of blood-poisoning were in a great measure avoided.

Dr. PARRY replied that sponges were used; but that each patient had her own sponge.

Dr. JENKS remarked that it was evident that two forms of the disease had been referred to in the discussion of the evening. In the one form, septicaemia occurs on the second or the third day, accompanied by general pathological lesions as fatty degeneration—the whole body being affected. The other form is more local, and attended with parametritis, perimetritis, etc. This is generally seen in the crowded wards of a hospital.

#### NEW GALVANO-CAUSTIC BATTERY.

Dr. BRAY exhibited a very compact form of galvano-caustic apparatus, and demonstrated its action by amputating the tail of a dog.

Dr. CHESTER MORRIS described a cheap form of battery which he had made, and which was very effective. It consisted of 4 oz. vials, each containing a piece of zinc and a piece of copper, connected by fours.

#### THE CORRECTION OF DIFFICULT PRESENTATIONS BY MANIPULATION.

Dr. PARRY read a paper on manipulation by the hand in correcting difficult presentations.

He advocated the introduction of the hand (the patient being thoroughly etherized) with the back to the hollow of the sacrum,

grasping the head of the child firmly, and then, by lifting the head above the brim of the pelvis, the desired movement can be effected. If the presentation is a face, it can be converted into a vertex presentation. If the position be occipito-posterior, it may be changed by rotation above the brim of the pelvis into an occipito-anterior position.

DR. PACKARD thought that in a face presentation it would be easier to introduce the hand with the back anteriorly between the child's head and the pubis, and then grasp the occiput and bring it down. He alluded to a case in which he had succeeded in thus changing the presentation from a face to a vertex.

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WE are compelled by want of space to omit the usual "*Quarterly Report on Obstetrics and Diseases of Women and Children,*" but will endeavor to remedy the deficiency in the next Number.—ED.

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## REVIEWS AND NOTICES OF BOOKS.

A SYSTEM OF MIDWIFERY, INCLUDING THE DISEASES OF PREGNANCY AND THE PUERPERAL STATE. By WILLIAM LEISHMAN, M.D., Regius Professor of Midwifery in the University of Glasgow, etc., etc. With 182 illustrations. Philadelphia: Henry C. Lea, 1873, pp. 715.

SINCE the appearance of this work we have noticed various exceedingly favorable reviews of it in different American periodicals; not until now, however, have we had occasion to look it over, and we are glad to be able substantially to endorse the above-mentioned good reports. Since it is not a compendium, containing about double the number of pages of Schroeder's Manual of Midwifery (reviewed by us in the last number of this journal), the author is, of course, enabled to give the reader a great variety of exceedingly useful and interesting information over and above that necessary to the mere practical knowledge of midwifery, and this he does in a very instructive and pleasant manner; as he says in the preface: "The meagreness of statistical details, references and illustrative cases is a part of the original plan, adopted with the view, as far as the subject will admit, of maintaining the narrative form." The author has well understood the art of making his book readable without in the least detracting from its scientific or practical value, and for this alone he deserves the hearty commendation of the profession. He has thus supplied us with a work which doubtless contains all the information the average student could desire to obtain about midwifery, and has referred here and there to some of the later researches and improvements in practice. We have one fault to find with the book, however, which prevents us from giving it the credit of being anything more than an attempt, like so many others, at an ideal "System of Midwifery," and that is the very general neglect, whether from defective acquaintance or from lack of appreciation, with which foreign literature, and particularly the later physiological researches made in Germany, are treated. This we have noticed to be a fault common to English, much more than to American, authors. Can it be owing to the fact, that among 50 English-speaking medical men in the German schools we meet on an average only *one* Englishman?

The illustrations, which are so useful and necessary to the comprehension and explanation of many of the intricate prob-

lems of obstetrics, and the absence of which we have of necessity been obliged to deplore in Schroeder's *Compendium*, are for the most part excellent, particularly those on the anatomy and physiology of the uterus, ovaries, and ovum. In conclusion, let us repeat what we intimated in the first sentence of this review: The book is decidedly a good one, and in our opinion, the best modern work on the subject in the *English* language. Let the number of pages of "Schroeder," however, be doubled and a complete "System" on its present plan, instead of merely a "Manual" or "Compendium," be made of it, and we are afraid Dr. Leishman's book would hardly bear the comparison.

A CLINICAL HISTORY OF THE MEDICAL AND SURGICAL DISEASES OF WOMEN. By ROBERT BARNES, M.D., London, etc. With 169 illustrations. Philadelphia: Henry C. Lea, 1874, pp. 791.

WE take pleasure in making an exception to the rule of defective reference to foreign literature and improvements, so frequent in English medical works, in favor of Dr. Barnes's excellent book. Did not the *American Journal of Medical Sciences* for April, 1874, already contain such an able and exhaustive review of it, we should not deny ourselves the gratification of reviewing it thoroughly and discussing its individual chapters. As it is, however, we do not feel it incumbent on us to more than glance at some of its chief merits and point out a few of the particulars in which it surpasses its contemporaries.

Our attention is attracted at the first glance by the excellence and novelty of the illustrations, which are taken mostly from specimens in the museums of the College of Physicians and the London Hospitals, and among which the absence of the hackneyed diagrams, usually copied from one treatise into the other, is a great relief. The illustrations in the chapters on the anatomy of the uterus and ovaries, diseases of the Fallopian tubes, extra-uterine gestation, developmental faults of the uterus, prolapsus and inversion, fibroid tumors, and cancer of the uterus, deserve especial mention.

Dr. Barnes appears to be intimately acquainted with the literature of the European continent and America, and refers on almost every page to the researches and observations of foreign and American authors, down to the latest publications, yet always stating clearly the views and practice peculiar to and original with himself.

A new word has been coined by Dr. Barnes to express "the condition of difficult or painful performance of the sexual

function," the causes of which may be congenital or acquired, which condition includes "vaginismus," and is termed by Dr. B. "dyspareunia" from the Greek, *δυσπαρευνος*, a word used by Sophocles in this sense. A chapter is devoted to this affection, which, expressing as it does more than the term "vaginismus," has not hitherto been deemed worthy of special attention.

The chapters on the anatomy of the genital organs, menstruation, the physiology and pathology of the diseases of the ovaries and tubes, extra-uterine gestation and developmental faults, metritis and endometritis, pelvic inflammation, hamatocele, prolapsus and inversion of the uterus, fibroid and other tumors of the uterus, may perhaps be pointed out as particularly interesting and thorough; we do not, however, desire to be understood as slighting the remainder of the book, and find ourselves, therefore, compelled to close our report by recommending the work as second to none of the English Gynecologies of the present day. The recognized excellence of the other two most recent works, Thomas's and Hewitt's, prevents our saying more, and to be considered worthy to rank with these, is surely praise enough.

TRANSACTIONS OF THE LONDON OBSTETRICAL SOCIETY FOR THE YEAR 1873. London: Longmans, Green & Co., 1874.

As usual this annual volume contains a number of able, interesting, and valuable contributions from many of the coryphæes of the medical profession in Great Britain and others. The titles of a few of the most interesting communications are the following: A case illustrating the treatment of post-partum hemorrhage by the intra-uterine injection of the perchloride of iron, by Heywood Smith; On the progress of pelvic pathology for the last 25 years, by Edward J. Tilt; On the pathology of certain so-called multilocular ovarian-cysts, by Geo. Grenville Bantock; On the common skin-diseases of children, by Alfred Wiltshire; Case of extroversion of the bladder, etc., by Cooper Rose; Case of extra-uterine pregnancy, gastrotomy successfully performed, by Wm. Ross Jordan; Note on the diagnosis of extra-uterine pregnancy, by Lawson Tait; Case of gastrotomy for supposed extra-uterine gestation, by Alfred Meadows; A case of hypertrophic elongation of the cervix uteri at the full term of pregnancy, by George Rope; On the spontaneous separation of the placenta when it is prævia, by J. Mathews Duncan; On the diagnosis of subacute ovaritis, by Edward John Tilt; On the use of intra-uterine stems in uterine disease, by C. H. F. Routh, etc., etc.

CLINICAL RESEARCHES IN ELECTRO-SURGERY. By A. D. ROCKWELL, A.M., M.D., and GEORGE M. BEARD, A.M., M.D. New York: Wm. Wood & Co., 1873, pp. 72.

This little volume contains the reports of a number of cases of various forms of disease treated by the authors by means of electricity, principally central galvanization and electrolyzation, in the usual manner, or according to the new plan devised by them, viz., "*by working up the base*," inserting the needles around the base of the tumor. The diseases thus treated, and usually with complete or partial success, were erectile or vascular tumors, bronchocele, cystic tumors, epithelioma (electrolyzation of the base very successful), scirrhus, uterine fibroid, recurrent fibroid, indolent ulcer, in all twenty reported cases. Besides, fifteen cases of various cutaneous diseases are reported, such as chronic eczema, acne, prurigo, lichen agrius, psoriasis, and pityriasis, which, with the exception of the two last named, improved greatly under central galvanization. We appreciate the candor of the authors in reporting not only their favorable cases, but also their failures, which are greatly in the minority, and recommend the book to the notice of those of the profession interested in electro-therapeutics.

P. F. M.

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LECTURES ON THE CLINICAL USES OF ELECTRICITY, DELIVERED IN UNIVERSITY COLLEGE HOSPITAL. By J. RUSSELL REYNOLDS, M.D., F.R.S., Professor of the Principles and Practice of Medicine in University College, etc. 2d ed. Philadelphia: Lindsay & Blakiston, 1874, pp. 118.

ANNUAL REPORT OF THE SUPERVISING SURGEON OF THE MARINE HOSPITAL SERVICE OF THE UNITED STATES, for the fiscal year, 1873 (1st July, 1872, to 30th June, 1873). JOHN M. WOODWORTH, M.D. Washington: Government Printing-Office. 1873.

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ORIGINAL COMMUNICATIONS.

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SYPHILITIC LESIONS OF THE OSSEOUS SYSTEM IN INFANTS  
AND YOUNG CHILDREN; THEIR CLINICAL HISTORY,  
PATHOLOGY, AND TREATMENT.

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(Continued from May number, p. 119.)

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IX.—THE ENLARGEMENTS OF THE CARPAL, TARSAL, METACARPAL  
AND METATARSAL BONES, AND OF THE PHALANGES.

HAVING now studied the clinical features of the swellings upon the long bones, we come, in anatomical continuity, to the study of the lesions of the bones composing the hands and the feet. Thus far, in our survey, we have been occupied with syphilitic swellings developed at the junction of the diaphysis of a long bone with either of its epiphyses; now we come to the consideration of the swellings produced by syphilis in the short, irregular, and flat bones. In these latter the mode of enlargement is not the same as upon the long bones; for of the short and irregular bones the whole structure is more or less enlarged, while upon the flat bones peculiar, prominent, and circumscribed swellings are variously distributed upon their surface. The similarity in the general appearance of the swellings of the short and irregular bones which com-

pose the hands and feet, as well as their intimate anatomical relations, render their study together peculiarly appropriate.

The clinical history and pathology of the syphilitic lesions of these bones in the adult subject<sup>1</sup> have already been quite fully considered by me about three years ago, and last year<sup>2</sup> I called attention to some of the features observed in the lesions of these bones of the young child when afflicted with syphilis; but as this latter account was limited to a cursory description of the swellings of the phalanges and metacarpal bones, it is necessary, in keeping with other parts of the treatise, to go over the whole subject systematically. Then, as there are certain well-marked differences in the clinical features, and in the pathological processes between the swellings in infants and in adults, a separate description of them becomes the more necessary.

The clinical facts<sup>3</sup> which have thus far been elicited show that any of the bones of the hands or feet are liable to syphilitic lesions, and statistics show that certain of them seem to be more prone than others. Commencing with the phalanges, we find that they are very frequently involved. In Archambault's case all of the distal phalanges were found to be swollen; in my two cases, in Bulkley's two cases, and in Smith's case, the proximal phalanges were swollen, and I have very recently seen two other cases in which these same phalanges were enlarged. When the swelling invades the third or distal phalanges, the deformity is very striking, and the fingers have a bulbous or clubbed shape, similar, in a measure, to the deformity observed in syphilitic onychia. We have no recorded in-

<sup>1</sup> On Dactylitis Syphilitica, Am. Journal of Syphilography and Dermatology, Jan., 1871.

<sup>2</sup> Clinical Observations on the Syphilitic Lesions of the Bones of the Hands of Young Children. Brown-Séguard's Archives of Scientific and Practical Medicine, No. 4, 1873.

<sup>3</sup> Though attention is called in this work to swellings being more liable to occur upon certain bones and upon certain sites rather than upon others, it is not intended at all to convey the impression that there is any specific selection of site or of a particular bone, as such a view would be unphilosophical and untenable, as there is really no bone of the body which possesses an immunity to the syphilitic action; on the contrary, it is only intended to draw general conclusions from what appears to be the most frequently occurring conditions or coincidences in clinical practice, as from experience we know that such are tolerably good guides for the deduction of general facts.

stance of the second or middle phalanx being the seat of syphilitic lesion in very young children; but, judging from the appearances observed in a case of simple enlargement of the second phalanx in a very young child, I should say that such a swelling would present very well-marked features. As this case has considerable interest as regards diagnosis, I have thought it advisable to append it in a foot-note.<sup>1</sup> A finger thus enlarged would of course be quite clumsy in its movements. As all of the phalanges seem to be prone to syphilitic inflammation, it is very probable that cases of enlargement of the second phalanx will be observed hereafter. I have seen three cases of syphilis in which this phalanx was swollen. One of them was the patient whose history, in all its details, has

<sup>1</sup> Sophie S., a thin child and of slight build, aged five weeks, was sent to me, in August, 1871, by Dr. J. Aub, then of New York, now of Cincinnati, with a view of determining whether or not it was the subject of hereditary syphilis, and whether its lesion was dactylitis syphilitica. The child did not present any syphilitic lesion or symptom, and a very careful examination of its parents convinced me that they were not syphilitic. The index finger of the left hand was very much enlarged, the swelling being greatest at the middle phalanx, and from that region it gradually tapered off on each end. Examination showed that this phalanx was enlarged uniformly, having a perfectly smooth surface. The integument immediately over the swelling was very much stretched and of a pinkish hue, elsewhere it was normal. Under the integument which covered the enlarged phalanx a number of large vessels were readily seen. As I was examining the finger, in the midst of an almost dazzling sunlight, I was struck with the translucent appearance of it at this part, and when I shaded its borders and held it up between my eye and the sunlight, the translucency of the swollen phalanx was well marked; so much so that any small object, like the end of a lead-pencil, was dimly visible on its opposite side. The smaller vessels were also rendered apparent in this examination. The finger at the middle of this phalanx measured two inches and one-eighth, while its fellow of the right hand measured fifteen-sixteenths of an inch at this part. The swollen phalanx was very nearly as thick at each end as it was at its central part. The mother informed me that the swelling had been observed at birth, and that it was then fully as large as it was when I saw it, and she thought that it did not give the child any uneasiness or pain. As the parents were healthy, there was no reason for attributing the swelling to any inherited blood disease, particularly as it was an unique lesion, and occurring, as it did, in utero, traumatism was to be wholly eliminated as a cause. My diagnosis, then, was that it was a simple hyperplasia of the cartilage composing the phalanx, and that the proliferation had begun in all probability about the time when ossification had commenced in the bone, probably about the tenth or twelfth week of intra-uterine life. I am of the opinion, from the history of the case, that the swelling consisted of unossified cartilage, and the translucence of the tissue is somewhat in favor of such a view.

already been published by me;<sup>1</sup> the second was the case of a man having tertiary syphilis and enlargement of the first and second phalanges of the right index finger. In both of these cases the dactylitis resulted from acquired syphilis. The third case was one of hereditary syphilis, and occurred in the person of a boy, aged eight years, who, when five years old, among other osseous lesions, had an enlargement of the second phalanx of the left middle finger. I shall describe this case at some length in an appended note, at a later portion of this work, for by bringing out its points in a clear manner, and by contrasting its features with similar ones observed in the young child, it will convey a true idea as to the differences in the clinical history of the osseous lesions of the bones of the hands as developed early in hereditary syphilis, from those developed in later years.

By far the most frequently do we find that the first or proximal phalanges are the seat of syphilitic enlargement. Thus I have observed it in my two cases, as in Bulkley's two cases,<sup>2</sup> and it also occurred in Smith's case, making a total of five against one in which the distal phalanges were swollen. The deformity is very noticeable. The swelling may be slight, but usually is quite well marked, enlarging the bone to twice or thrice its normal diameter, its length being sometimes slightly increased. The general shape of the bone in its breadth is round, while it appears to have in its longitudinal direction an oval shape. It is somewhat broader at its base than at its distal end, the swelling beginning quite perceptibly at the metacarpophalangeal joint, which it enlarges, and ending somewhat abruptly at the next joint. The shape of the bone may be compared with that of an acorn. The rounded appearance of the body or middle part of the bone can be distinctly felt on its dorsal surface; but it is perhaps more perceptible to the eye on its palmar surface, where this portion of the finger bulges out in the various directions. The integument is generally very much stretched, and it is probable that, when this condition is excessive, ulceration may be induced in it, as we know that the integument of infants inflames under very slight irritating

<sup>1</sup> Op. cit., page 13.

<sup>2</sup> I have also very recently seen, as I have said before, two other cases in which the proximal phalanges were enlarged: in one, two fingers of one hand and one of the other were affected; in the other, one finger of each hand was enlarged. The little finger was not swollen in either case.



causes. We shall see further on that this ulceration of the integument may also result from localized degeneration of the bony tumor itself. The integument may or may not retain its normal color; I have seen it of the natural hue, when the phalanx under it was enlarged to fully twice its normal size. When, however, the bone-swelling is so great as to cause much interference with the circulation, a redness will, of course, appear, which may be simply of a rosy blush, or even of a well-marked venous color. This redness of the skin covering the phalanx might sometimes lead the surgeon to fear that ulceration was imminent, when really such a complication was very remote. Thus, in the case of simple phalangeal enlargement just mentioned, as well as in one of the fingers of the case of Dr. Hanks, the redness might have been, upon casual observation, regarded as indicative of phlegmonous inflammation; but an examination of the suppleness of the integument, of its mobility—though slight over the parts beneath it—of the absence of heat and pain, and of the fact that slight pressure emptied the vessels for a comparatively long period, convinced me that the process was a passive rather than an active one. The condition of the integument in these cases may be said to be generally that of passive hyperæmia, and that when the pressure from within is excessive, acute inflammation may be induced. The integument being thus stretched, loses its slight furrows and surface-markings, but at either end of the swollen phalanx, just over each joint, a quite deep furrow or wrinkle is usually seen. This hyperæmic condition of the integument may or may not present a characteristic syphilitic hue. Thus it may be simply of a rosy red or even slightly purplish color, and it may remain in this condition throughout its duration. Or, again, when it has been fully developed, it may assume the somewhat coppery tint peculiar to syphilitic subjects, in which event the feature would perhaps have some little diagnostic import. I saw this condition quite well marked in a case of this complication in which ulceration supervened. However, I think it may be asserted as a quite constant clinical fact, that very often, in cases of tegumentary inflammation, either ulcerative or non-ulcerative, this peculiar coppery tint is either slightly marked or absent, and that it is not by any means as constant early in hereditary syphilis as in adult acquired syphilis.

I am inclined to think that the greater or less degree of disturbance to the circulation and nutrition of the skin, and consequently its more or less hyperæmic appearance, is dependent on the fact as to whether the bony swelling has occurred rapidly or slowly; in the former condition the disturbance is great, as the parts have not time to adapt themselves to the bony expansion within; when, however, the swelling is slowly produced the parts do adapt themselves to the increasing size, the connective and fatty tissues undergo atrophy, and even the skin itself may likewise be changed, and then there may be no hyperæmia at all. I saw this condition well exemplified, last year, in a case of acquired dactylitis syphilitica, in which two phalanges were increased to fully four times their natural size, and in which the skin showed no hyperæmic or ulcerated condition. It had undergone great atrophy, its connective tissue was perhaps nearly all gone, and it appeared as a very thin tegumentary covering, readily movable over the bones.

I have several times noticed a very peculiar and deceptive appearance of the second phalanx, which might lead the observer to suppose that it also was the seat of enlargement. As the expanded distal extremity of the first phalanx ends at the joint, the bone of the next phalanx rests, of course, by articulation upon it, and the ligaments pass from the expanded part of the joint to the other non-expanded end; consequently the whole structure appears enlarged, and as the skin over the enlarged part is stretched out, and does not fit with perfect coaptation to the bone until about opposite the other end of the second phalanx, an appearance is presented as if the proximal half or third of the second phalanx was also enlarged. A careful examination and manipulation of the parts will show conclusively that the lesion is confined to the first phalanx, and this view will be verified as the case is examined from time to time when resolution is taking place. This same expanded condition of two phalanges, the first and the third, was observed in the case of simple cartilaginous hyperplasia of the second phalanx, just cited. I have, in one instance, seen this tapering condition of the finger so well marked that my impression that the second phalanx was swollen in a diminishing manner, from its base to its end, was so strong that it was only removed by numerous and careful examinations, extending over some months.

In a case of dactylitis from acquired syphilis, reported by Nélaton, and quoted by me,<sup>1</sup> the statement is made that the three phalanges of the fingers were swollen, the first markedly, the second slightly, and the third in a scarcely appreciable manner. I am inclined to think that the first phalanx was the only one involved in the lesion, and that the tapering shape of the finger resulting therefrom led to the opinion that the morbid process involved the other phalanges in a gradually diminishing degree. This view has the support of two well-authenticated facts or observations; the first being that a phalanx has never, as yet, been observed to be swollen in a local manner by syphilis, it always having been found totally and uniformly enlarged;<sup>2</sup> the second being that in every recorded case where two phalanges of the same finger have been swollen, the enlargement in each has been so great that no doubt of its existence could be entertained. This point is of very great interest, in a diagnostic point of view, as regards rheumatoid arthritis.

It is interesting to know also that this tapering condition of the fingers is rendered more noticeable and characteristic, when there is an infiltrated condition of the integuments, whether due to inflammatory engorgement or to gummy deposit. In these conditions the examination of the bones is

<sup>1</sup> Op. cit., p. 7, *Gazette des Hôpitaux*, 1860, pp. 105 and 106.

<sup>2</sup> The details of all the cases thus far recorded tend to establish this as a fact, and certainly prove that a tapering condition of the bones has never been found. Yet, when we remember that the phalanges are essentially miniature long bones in construction, consisting of a diaphysis and an epiphysis, and also that at the junction of these segments syphilitic changes are prone to develop, it seems reasonable to suppose that these local swellings might occur here. Indeed, it is somewhat surprising that they have not been found already. Should such a development be noticed, the diagnosis would rest between syphilis and rheumatoid arthritis. In syphilis the swelling would begin further down on the shaft, and should be more extensive than in the other affection, the swelling of which should be localized at the joint structure, involving it in its entirety; whereas in syphilis the enlargement would stop short at the end of the phalanx. Of course, in arriving at a conclusion, the various other concomitant circumstances should be taken into account. These considerations apply more properly to the syphilis of more advanced age; still, as we meet with rheumatoid arthritis even in very young children, the suggestions are important. This localized form of syphilitic swelling will be spoken of in the section treating of enlargements of the metacarpal bones. Apropos of this subject, it is well to mention that the epiphyses of all the phalanges are situated at the proximal ends of the bones.

difficult, and the conclusions as to their size are perhaps rendered less accurate. But, as in infants we do not often find co-existing gummy infiltration into the integument of the fingers and toes, this as a complication will perhaps never be met, though of course it may be observed later on in the course of the disease. <sup>1</sup> Volkmann's case, which was quoted by me, with its illustration, was that of a woman whose fingers of one hand presented this tapering condition in a marked degree; the lesion being both of the osseous and tegumentary structures.

There is no mention in any of the recorded cases of hereditary dactylitis syphilitica of any concomitant lesion of the nails, and it is very probable that if such an affection should be synchronously developed, that it would be an accidental rather than a direct result of the bone enlargement. A furrowed condition of the nail, similar to that observed after adynamic diseases, was observed by me <sup>2</sup> in my case of dactylitis of acquired syphilis; but this condition resulted undoubtedly from the interference with the circulation and nutrition of the parts, caused by a very copious gummy infiltration into the integument of the toe. In the early form of hereditary dactylitis, as there is never, as a rule, such a co-existing infiltration <sup>3</sup> into the integument, it is very probable that there will not be any complicating lesion of the nail, at least arising from that cause. As the nails are composed of a modified dermal tissue, and are nourished directly from the derma, any lesion of this tissue acts, of course, upon the nails and impairs their nutrition.

Lancereaux <sup>4</sup> makes the suggestion that in acquired syphilis the nails may be affected by osteitis or periostitis of the last phalanges. I think that, for the reason above given, they are much more likely to be involved when the derma is the seat of morbid change, though they may be secondarily involved if the

<sup>1</sup> Op. cit., pp. 11-12.

<sup>2</sup> Op. cit., pp. 7 and 8.

<sup>3</sup> It will be shown further on that a very copious infiltration of the skin has been met with in some of these cases, but it has always been of an inflammatory character, not consisting of gummy granulation tissue, and has resulted as a complication produced by the pressure of the bony tumor, or by being involved in its degeneration. Being then a simple inflammation, it does not seem to impair the nutrition of the nail, as a chronic infiltration has been known to do.

<sup>4</sup> *Traité historique et pratique de la Syphilis*. Deuxième édition, Paris, 1873, page 178.

osteitis or periostitis undergo degenerative changes. We have no recorded instance of such a complication, though all of the last phalanges were enlarged in Archambault's case, and one of them was involved in Volkmann's case,<sup>1</sup> there being no coexisting lesion of the nail. I think that the possibility of the coexistence of these lesions was suggested to Lancereaux's mind in examining cases of syphilitic onychia, in which, as usually occurs, there was a general enlargement of the phalanx, due to secondary hyperplasia of the dense fibrous tissues under the nail and around the bone. If such a case is critically examined during its entire course, it will become clearly evident that the lesion is limited to the nail, and that all other infiltrations are simply the result of congestion. As onychia is very often observed in hereditary syphilis, it is well to clearly understand that it is essentially a lesion of the nail structures, and that it does not in a direct way involve the bone, except, perhaps, as a rare occurrence.

In this swollen condition of the fingers there is, of course, some degree of distortion of their position. This is particularly noticeable if the first phalanx is the seat of swelling, and is more pronounced in proportion as the bone swelling is great, and when it involves, as it generally does, the palmar surface of the bone, the dorsal surface, of course, being proportionately enlarged. In this event there will be observed a decided flexion of the member, and it will be found that even firm and continuous pressure will fail to straighten it. This condition results from the pressure of the bony tumor upon the flexor tendon, and varies with the course of the swelling; so that if a case be followed carefully it will be seen that extension returns very gradually with the subsidence of the enlargement of the phalanx. It is most marked in the case of the fingers, and not as much so when the thumb is the seat of swelling.

Besides this temporary deformity, the swelling of a phalanx affects the position of other fingers, particularly if the swollen one is either the middle or ring finger; in which case the others are pushed to each side, when, being thrown out of their direction, their usefulness is somewhat lost. This fact can be well brought out by giving the child a small thin article to clasp, in

<sup>1</sup> *Op. cit.*, page 12, and *Berliner klinische Wochen-schrift*, No. 7, 1870.

which case the movement will be seen to be very awkward, and the grasp to be unsteady. The everted condition of the fingers is not as great when the index or little finger is swollen, and does not exist when the thumb is involved. Whichever member is affected, however, the usefulness of the hand becomes impaired.

Our study has thus far been, while treating of lesions of the short and irregular bones, confined to the syphilitic swellings of the phalanges of the fingers, it being fair to assume that the bones of the toes are affected in a similar manner; in which event they would present somewhat analogous phenomena. We have not on record a case of hereditary dactylitis in infants affecting the toes; so it will remain for future observation to determine the relative frequency of the lesion. To the extent of my reading, the first direct record of syphilitic swellings of the fingers and toes is in the treatise of Baumès,<sup>1</sup> who speaks of a case of hereditary syphilis in a young child, the phalanges of whose hands and feet were enlarged; but the author alludes solely to the swellings. But Mahon,<sup>2</sup> in his work on the Syphilitic Diseases of the New-Born, says that children afflicted with hereditary syphilis are subject, among other diseases, to softening and curvature of the bones, particularly of those of the hands and feet. Though we have not the recorded fact of an infant the victim of hereditary syphilis presenting a swelling of the phalanges of the toes, such a lesion was found by Volkmann<sup>3</sup> in his case of hereditary syphilis, the patient being sixteen years of age. In this case all of the phalanges of one toe were swollen; but as the lesion was of the same nature as that produced by acquired syphilis, the case is not applicable to our present study, nor do the statements of Baumès or Mahon in any degree instruct us.

The various complications which may arise during the existence of these phalangeal swellings will be treated of at length a little further on; but it may not be inappropriate to state here that degenerative changes of the bones are very fre-

<sup>1</sup> Précis théorique et pratique des maladies vénériennes. Partie première, page 178. Paris, 1840.

<sup>2</sup> Recherches importantes sur l'existence, la nature, et la communication des maladies syphilitiques dans les femmes enceintes, dans les enfants nouveau-nés, et dans les nourrices. Page 456. Paris, 1804.

<sup>3</sup> Op. cit., page 11.

quently met with in the dactylitis syphilitica of infants and young children, and that, resulting from these changes, there is a greater or less implication of the integument. This fact will be brought out as showing one point of difference between the course of early and late dactylitis. There is no mention in the records of any of the cases of any synchronous development of joint-lesion in these phalangeal swellings, while such a complication is not at all exceptional in the later form of the trouble. This point, which is also a distinguishing one, will be fully brought out hereafter. Should, however, a joint complication exist it would in all probability be a synovitis, with perhaps an hydrarthrosis, both being secondary to the bone lesion; inflammatory in its course, and attended with pronounced symptoms. As this is the condition, and as there is usually no gummy deposit at this age, the ultimate result would be that scarcely any impairment of the part would be induced; whereas if the lesion was due to gummy infiltration, the course would be very slow, and the result a greater or less destruction, with impairment of the joint.

Taking, now, the various cases into consideration, it is interesting to determine how frequently the phalanges are involved in the syphilis of infants, as compared with the affections of other bones. Thus, within this limit, I include eleven of my cases, the two cases of Dr. Bulkley, and that case seen by me but once, making a total of fourteen. Out of this number of cases of bone syphilis the phalanges were found to be involved four times, making a frequency not quite as great as that of enlargements at the distal diaphyso-epiphysal junction, and slightly greater than the swellings at the proximal junction, and also of bone lesions elsewhere upon the body. Of these four cases, the bones of the hands were involved symmetrically<sup>1</sup> in but one case, in which two fingers of one hand and two of the other were enlarged; in a second case, two fingers of but one hand were swollen; and in two, one finger of one hand only was enlarged. In Curtis Smith's case, three fingers of one hand

<sup>1</sup> Of the two cases which I have seen since this work was written, in one the lesion involved both hands, enlarging two fingers of one hand and one of the other; in the other case one finger only of each hand was involved. In each the bones of the toes escaped, the phalanges being the only bones of the body enlarged.

were affected, while in Archanbault's case every finger was said to be implicated. In the larger proportion of cases, then, an unsymmetrical development was observed, as is the rule in the dactylitis of later life. The swelling of two or more fingers seems to have occurred rather oftener than that of one; yet in so limited a number of cases this slight difference cannot be greatly insisted upon. It is very probable that in a large number of cases the unique and multiple developments would be in equal proportions. The case of Archanbault, in which every finger was involved, is very exceptional. A perusal of the various cases shows clearly that in every instance only one phalanx of each finger was enlarged; never were two thus affected. Besides this feature, which is peculiar, there is no instance in which a local swelling of the bone was observed, there being always an uniform enlargement. Perhaps in these particular cases the localization of the lesion to one phalanx of a finger was a matter of chance development; yet, as compared with this fact, we know that in four given cases of late dactylitis syphilitica, two phalanges of the same finger would have been found to be synchronously enlarged once, and perhaps more than once; so that, as a comparative fact, it is important. This synchronous affection of two phalanges will be found hereafter to have considerable bearing upon the development of joint-lesions, and its absence, perhaps, affords one reason why in the early form of the affection we have not observed an implication of these structures. Although we cannot lay down the fact as a rule, that only one phalanx is involved in this early form of dactylitis, the absence of a case showing multiple enlargement of the phalanges of one finger gives considerable weight to the fact, and we may thus accept this as a tolerably constant peculiarity of this affection. It is proper to state, however, that in Volkmann's case of hereditary syphilis there was in several fingers enlargement of more than one phalanx; but this occurred in a person sixteen years of age, and the lesion was of the character generally found in a late acquired dactylitis, which we shall find differs materially from the lesion of the infant life. Parrot found at the autopsy an enlargement of the first phalanx of the right middle finger in his second case. It seems that certain fingers are more liable to this affection than others. Thus in the cases seen by me the



thumb was affected twice, the index finger twice, the middle finger once, and the ring finger once. In Smith's cases, the index, middle, and ring fingers were affected. From this it would seem that the little finger is not frequently affected, as there is no mention of the fact except in Archaubault's case, in which every finger was involved. As has been said before, the first phalanx is the only one usually invaded, while the swellings of the others are quite exceptional. These phalangeal enlargements may coexist with other bone-swellings, as well as, of course, with other varieties of syphilitic lesion. In the cases thus far recorded the dactylitis was either coexistent with swellings of the metacarpal, metatarsal and tarsal bones, or existed as the only bone lesion. As we have already noticed a decided predilection for syphilitic hyperplasiae to develop just at the junction of a shaft with an epiphysis, it seems singular that this form of swelling has not been found upon the phalanges of the fingers and toes, as they also are composed of a body and a distal epiphysis, which remains separate until about the twentieth year. Not only has this form of swelling not been observed in infants, but it has also never been met with in the syphilitic swellings of adults; for, as has been said before, the swelling has in each instance been found to involve the whole bone. It is interesting to bear this fact in mind, as the occurrence of such a case is quite probable.

We find that, like the phalanges, the metacarpal and metatarsal bones are also swollen in cases of hereditary syphilis. As shown by three cases, which illustrate enlargements of the first and second metacarpal bones, these swellings are of greater or less extent, and are not locally developed, but involve the whole length of the bones. In the hand the swellings of the bones are greatest at their middle portion, and less at each end, the bone, in its long diameter, having, consequently, a somewhat oval outline. Though the bone is greatly increased in diameter its length is not at all altered. In Morgan's case, which was that of a child three years old, the metacarpal bone was enlarged so much that it measured two inches across, and in my case the same variety of bone, in a child four years and four months old, measured one inch and a half in diameter, while the same measurement of its fellow was hardly half an inch. According to present observation, the surface of these swell-

ings is smooth. The deformity produced by such prominent swellings is, of course, very striking both on the palmar and on the dorsal surface of the hand, where they present well-defined and clearly limited elevations of the skin over the particular bones involved. This clearly defined and limited condition of the swelling becomes an important point in the matter of diagnosis. The integument is, of course, more or less stretched, and varies in hue according to this condition, as we have found in the phalanges. The function of the finger springing from a bone thus swollen is somewhat impaired, as it is not as steady in its movements as the others are, owing to the fact of the interference with the working of the two tendons, and the power of grasping various articles is somewhat lost. Thus if the thumb of my patient was flexed towards the ulnar side of the hand, it was found that it could not, nor could it be made to touch the bone of the little finger by a distance of half an inch, an action easily accomplished on the other hand. There can be no doubt but that in Morgán's case, also, the usefulness of the hand was diminished, and that the child could not hold anything with the combined action of fingers and thumb. Though we have no instances of the last three metacarpal bones being the seat of this enlargement, we have no reason for supposing that such a condition might not occur, when undoubtedly they would present the same general features that have been observed in enlargement of the other bones. As there is not a great deal of space, however, between these last-mentioned bones, the swelling would not, of course, develop itself as much laterally as it has been seen to do in the cases already cited. The enlargement of the bone would go on until those on each side no longer allowed it; then probably, if the lesion continued, the swelling would be in the direction of the palm and of the dorsum of the hand. When fully enlarged, under these circumstances, the bone, if examined upon transverse section, would appear as if rounded and laterally flattened. In the case of the first and second bone there is no hindrance to expansion, as the ample triangular space which exists between them allows of great swelling before it is filled up. In the event of the fifth metacarpal bone being enlarged, it is very probable that the swelling would be mostly developed towards the ulnar side of the hand, and there it

might attain large proportions. These bones, according to present observation, have only been found to be involved in two cases.

Turning our attention now to the foot, we study the swellings of the metatarsal bones. In this instance we have very few clinical data to guide us, as there is only one recorded instance in which these bones have been found enlarged. In this case the lesion was developed in the fourth and fifth only. The swellings consisted of an uniform enlargement of the bones, there being no noticeable difference in their diameter at any part. There was, of course, considerable deformity observed on the back of the foot, but the elevation of the integument was strictly limited to the region of the two bones. To the touch, the enlargement was more evident on the dorsal aspect of the foot, and the contour of the fifth bone more clearly made out than that of the fourth; of this, the portion which rested against the side of the third bone could not be clearly defined, and the line of separation between it and the fifth not very accurately traced. But the examination on this surface was not wholly unprofitable, as the bone swellings could be satisfactorily localized; whereas, when they were traced, with every care, by the tip of the finger upon the plantar surface, they could scarcely be distinguished as being swollen. This I attributed to the density and resistance of the plantar fascia, and also to the mass of the soft tissues under and over it. I think that this observation establishes the fact very clearly that swellings of the metatarsal bones cannot be examined well on their plantar surface. Upon the palm, when the first, second, and fifth metacarpal bones are swollen, I think it will be found that their examination is both easy and satisfactory, as at these situations the palmar fascia is not dense; but when any of the intermediate bones are enlarged, I imagine that their exploration upon this surface is as profitless as similar explorations on the plantar surface.

As the metacarpal and metatarsal bones are composed of a shaft and an epiphysis, it is not improbable that in the hereditary syphilis of infants, and even in acquired syphilis, up to the age of twenty, swellings may be developed at their junction. In this event the enlargements would be, for all except the first, at the head of the bones, just near the metacarpo or metatarso-phalangeal articulation, while at the first bone it would be at the

base, near its carpal joint. There is no record of such a case in the syphilis of infants, but I have full notes of a case of hereditary syphilis in a girl twenty years of age, who, among other most extensive and varied osseous lesions, had prominent swellings at the heads of the third and fourth metacarpal bones of the left hand, and a swelling at the base of the first metacarpal bone of the right. This suggestion may explain cases in future which might appear exceptional. As the epiphyses fuse with their shafts at about the twentieth year, it is very probable that such swellings will not be met with after that period, unless indeed the morbid process had begun previous to the twentieth year; though, as I have said before, this peculiar localization of the swelling of the metacarpal and metatarsal bones has not been observed in a living case of a syphilitic infant, such a swelling was found, on post-mortem examination, by Parrot in his fourth case, in which the distal end of the fourth metacarpal bone was found to be enlarged; a fact, I need not say, of very great importance. This observer also found enlargements of the metacarpal and metatarsal bones in his third and seventh cases; as did Wegner and Waldeyer and Köbner at the autopsy in some of their cases.

In clinical practice the carpal and tarsal are even less frequently swollen in syphilitic infants than any of the other bones composing the hands and feet. From their size, structure, and mode of growth, being composed of ossifying cartilage, it is probable that when affected by syphilis they will be enlarged in their whole extent. As lateral expansion is limited by their close coaptation, the swelling will, of course, point in the direction of the palm or sole, or of the dorsum. As the outlines of these bones cannot be clearly defined in the normal condition, so their examination when swollen will not result in perfectly definite conclusions. At the wrist the exploration can be made either on the internal or external aspect, but at the instep it must be conducted at the dorsum. In cases of enlargement of the astragalus, os calcis, or the other bones of either feet or hands, more externally, or rather, laterally situated, probably their outline could be followed with more precision. In the one case observed by me, in which one of the tarsal bones—it being probably the middle cuneiform—was swollen, the instep appeared enlarged laterally and in height, and

measurement showed that its circumference was greater by half an inch than that of the unaffected foot. The contour of the bone could not be defined, but the appearance was one of localized swelling. The condition of the parts in this case was rendered more difficult of examination as there was some synovitis of the small joints, and hyperæmia of the integument. Thus in this, the only case recorded, there were inflammatory complications. As we know that these syphilitic swellings of bone are mostly indolent in character, it is fair to presume that we shall find this condition to obtain in these situations, and that this was perhaps but an exceptional case. However, when we consider that these bones enter largely into the formation of joints whose use is constant, and that in a considerable part of their surface they are covered with synovial membranes, and are consequently more than ordinarily vascular, the suggestion forces itself upon us that here the conditions are favorable to the development of synovitis and tegumentary inflammation; for which reason they may often coexist, and form a complicating feature in these cases. In this event, if the complications are well marked, it can be understood that the original lesion may not be recognized, and even perhaps lost sight of. This would almost undoubtedly occur if the case was seen late in its course. This condition may perhaps explain many of the cases of so-called strumous inflammations of these bones and joints, and should be borne in mind, I think, in diagnosing swellings and synovitis of these parts. The inflammation of these bones, then, in syphilitic children, presents points of very great clinical interest. They have been found by Parrot and Wegner to be enlarged at post-mortem examination.

X.—THE SWELLINGS UPON THE CRANIAL BONES AND UPON THE BONES OF THE FACE.

Before treating of the lesions of the various other irregular bones, we will consider those of the skull. The swellings or nodes on the cranial bones are more or less circumscribed, and are variously scattered over their surfaces. Though a large number of cases have been reported, from time to time, within the past ninety years, these swellings may yet be considered as quite unfrequent. Thus, occurring only once in my experience, they have a proportion of one in fifteen, being one of

the most infrequent of the lesions of the bones of young children. This is, in my experience, in marked contrast with their frequency in the hereditary syphilis of later life, among which I have seen three instances of these swellings, and, of course, widely differing from their comparative frequency in the acquired syphilis of adults. From the number of cases on record, and from my own case, I think it may be assumed that certain of the cranial bones are more liable than others to the development of nodes in infants. Thus the frontal was the seat of them in four instances: in my fourth case; in that of Roger; in Parrot's third; and in Wegner's third case. The parietal was involved in three instances, namely, in Bärensprung's, Desmarres,<sup>1</sup> and in Wegner's fifth case. The occipital was affected in one instance, namely, Desmarres' case, in which also the parietal was involved. The description of the nodes in syphilitic infants, judging from my own case, and that of Roger, is similar to that of the same lesions of adults. They consist in well-defined, round, or oval tumors of varying size, from quarter or half an inch to even an inch or more in area, having a height averaging within three-quarters of an inch, and a smooth, rounded surface. Wegner speaks of slight elevations of the cranial pericostem of the size of flaxseed, as being quite commonly found at the autopsy, so that we may meet cases in which these minute nodes are developed. They are due to cellular hyperplasia. In my case the nodes disappeared gradually under treatment, without any inflammatory complications; but I have been struck with the fact that in the cases of Bärensprung,<sup>2</sup> Desmarres,<sup>3</sup> and Parrot,<sup>4</sup> they underwent quite rapid degeneration, and gave rise to extensive ulcers. Doublet,<sup>5</sup> in his treatise, also speaks of the suppurative of tumors of the cranial bones. These facts would certainly point to a peculiar tendency to degenerative changes in this region, and should, of course, be borne in mind in the diagnosis of suppurative inflammations of the head. It is well to mention, however, that in these cases the syphilis was very severe. When the tumors assume an inflammatory condition, and they have then been known to involve very extensive

<sup>1</sup> *Traité théorique et pratique des maladies des yeux*. Deuxième édition, tome i., page 626. Paris, 1854.

<sup>2</sup> *Op. cit.*

<sup>3</sup> *Op. cit.*

<sup>4</sup> *Op. cit.*

<sup>5</sup> *Mémoire sur les symptômes et le traitement de la maladie vénérienne dans les enfants nouveau-nés*. Paris, 1781.

surfaces, I can readily see how they might be mistaken for abscesses, particularly if late in their course, or if for any reason the surgeon is unable to elicit a clear history of the commencement of the process. The diagnosis can, of course, be established by the history and concomitant lesions, and by the fact of the deep-seated sub-integumentary position of the swellings when first discovered. Then, again, when an incision is made, the depth of the ulcer and its appearance, and perhaps the extrusion of portions of dead bone, will settle the question as to the focus of the morbid process. A point which is important, as showing that in their course these nodes in children may resemble those in adults, is brought out by my case, in which, after the resolution of the nodes, a distinct depression in the surface of the frontal bone on the site of each swelling was found. This is not uncommon in adults, particularly when the cases have been neglected, and the nodes have remained for very long periods. It shows distinctly that in the resolute process fatty degeneration had involved portions of the bone structure, as well as of the cell proliferation and heterologous tissue incident to the inflammation.

Though hardly material to our present consideration, I think it is well to mention the fact, that the internal surface of the cranial bones has also been found to be altered in syphilitic infants. Thus a case of abscess of the internal table of the frontal bone is mentioned by Howitz, in the *Hospitals Tilende*, and quoted by Behrend.<sup>1</sup> Cruveilhier<sup>2</sup> found in a case of a syphilitic child an abscess between the dura mater and the orbital plates of the frontal bones near its vertical portion. Charrier<sup>3</sup> found an abscess of the internal table of the frontal bone, as did Bargioni,<sup>4</sup> in the case already detailed. Wegner found internal cranial periostitis in two instances, and Waldeyer and Köbner in one. These facts show that in very severe forms of syphilis in infants these bones are very liable to be affected, either on their external or internal aspect, which nodes may be the only osseous lesions observed, as they were in the cases of Desmarres, Charrier, Bär-

<sup>1</sup> Ueber syphilitische Knochenleiden und ein eigenthümliches noch wenig bekanntes syphilitisches Lungenleiden bei kleinen Kindern. Syphilidologie, Neue Reihe Dritter Band, page 602 and 3. Leipsig, 1862.

<sup>2</sup> Atlas d'Anatomie Pathologique. Obs. 10, livraison 15. page 6. Paris.

<sup>3</sup> Cas de Syphilis infantile. Gazette des Hôpitaux, No. 43. 1854.

<sup>4</sup> Op. cit.

ensprung, Behrend, and Howitz, or they may be coexistent with lesions upon other bones, as in my case, in Rogers', and in Parrot's.

Very little can be said of syphilitic lesions of the bones of the face, as they seem to enjoy the same general immunity in syphilitic infants which they do in the acquired syphilis of adults. The only direct mention of any of these bones being affected occurs in the history of Parrot's third case, in which a thickening of the right coronoid process of the inferior maxillary bone was found, as well as the same condition at the symphysis menti. As it is a matter of some considerable doubt whether the coronoid process of this bone is developed from a separate centre, we are unable to say positively whether in this instance the lesion was of the same character as that observed at the junction of the diaphysis with the epiphysis of long bones, or whether it was a periostitis, but it is very probable that at the symphysis the lesion was of the first order. In his treatise upon diseases of children, Rosen de Rosenstein<sup>1</sup> says, that in order to determine whether a child has syphilitic osseous lesions, it is necessary to examine the condition of the inferior maxillary, the cranium, and the bones of the arms and legs, for tumors and exostoses. This statement renders it probable that this Swedish observer had also seen this bone affected in the syphilis of infants.

The necrosis of the nasal and palate bones, which occurs during long-continued severe syphilitic ulceration of the mucous membranes covering them, need but a passing mention, as they are quite fully described in the various general and special works on the diseases of children. Rosen speaks of a case of necrosis of the hard palate following syphilitic ulcers of its mucous membrane; a complication of lesions which I have seen twice in hereditarily syphilitic children aged six and eight years.

#### XI.—THE SWELLINGS ON THE VARIOUS IRREGULAR BONES.

In clinical practice tumors upon the ossa innominata, sacrum, coccyx, vertebrae, and scapula have not been found. At the autopsy of several children they have been observed by Valleix, Parrot, Wegner, Waldeyer, and Köbner to be the seat of syphilitic change. Most of these bones are so deeply situated that their exploration is difficult, if not impossible; therefore it is

<sup>1</sup> *Traité des maladies des enfants.* Trad. franç. Paris, 1793.



very probable that very little will ever be learned of these swellings in clinical practice. The cardinal point to remember in the examination of these cases, when swellings are discovered upon them, is, that syphilitic changes are peculiarly liable to develop wherever the body of a bone is continuous with an epiphysis; but of course we may find periosteal swellings on the surfaces of the bones. The diagnosis then may be arrived at by eliciting the history of the case, and by remembering the various anatomical points regarding the mode of ossification of the bone in question. Should the patella become the seat of syphilitic inflammation it would be enlarged after the manner of the tarsal bones.

XII.—THE DEVELOPMENT, COURSE, AND DISTRIBUTION OF THE  
OSSEOUS SWELLINGS.

Such, then, being the situation, distribution, and general character of these swellings, it remains for us, in our study of their clinical history, to trace their development, course, and decline, and also to consider the various concomitant symptoms and lesions incident to their existence. From a careful study of all of the cases, we observe that there are two principal forms or modes of development of these osseous enlargements; the first, in which the swelling is developed with comparative slowness, and the second, in which it is rather rapidly formed. Although no division can be so sharply drawn as to apply perfectly to every case, the present one will answer quite well the purpose of simplicity of description, by laying down general facts, and by forming a standard with which exceptional features and cases may be compared. In determining the rapidity with which these swellings form, it will be seen that there are certain drawbacks to be encountered. Thus, the child is always a passive agent, and cannot contribute any information, and as the swellings are not usually markedly salient, it is difficult to trace their progress in an accurate manner, particularly as the amount of increase is very slight. Then again, owing to various causes, they may escape observation until late in their course, so that under these circumstances we are frequently forced to resort to inductive reasoning; as, for instance, having ascertained the child's age, and, if possible, the date of commencement of the

swelling, we take into consideration its size, and from these points form an approximative idea of the rapidity with which it has been formed. In the main, however, our inquiries are attended with conclusions sufficiently satisfactory.

The swellings on the various bones are developed within a period averaging between two and six weeks, generally in the neighborhood of a month. This average was found quite constantly in the cases of swellings of the long bones near the epiphyses, and in others generally of considerable extent. It is very probable that they are never formed in less time than two weeks, except in very severe cases, and that they always attain their maximum size within two months. In some instances of circumscribed swellings of local distribution, as at either of the condyles of the humerus, and at the base of the olecranon, or in limited portions of a diaphysal ossifying surface, in which the enlargements are not usually great, it is probable that about two weeks are occupied in their production.

Little need be said, more than has been already, as to the size of the various swellings. Those of the diaphyso-epiphysal junctions are never, as a rule, extremely large. The histories of the various cases show that on the radius and ulna the swellings, on an average, reach an elevation of from one-half to three-quarters of an inch above the normal plane of the bone, and that upon the tibia and fibula they attain a somewhat greater height; it being very probable that these measurements are about the maximum which will be observed, for the reason that in cases in which a greater enlargement has occurred, degenerative changes have been engrafted upon the swellings when they have surpassed this limit. According to my observations the difference between the normal and abnormal circumference of the wrists averages between three-quarters and one inch, while at the ankles the difference is from one and a half to two inches.

Having reached the various limits of enlargement, these swellings evince a tendency to run an indolent course without any apparent change, in which condition structural changes of the bones may be induced, such as sclerosis and hypertrophy. But if appropriate and efficient treatment is instituted early, and followed sedulously, the swellings subside, and the bones are left nearly in a normal condition. This fact points strongly and significantly to the absolute necessity of treatment, and also

shows the necessity of accurate diagnosis in determining the nature of the tumors. The study of the various groups of cases warrants us in speaking with considerable precision as to the duration of these swellings, and of asserting that it depends on the following points: the extent and density of the swelling; the earlier or later period at which treatment is instituted; and the care with which it is ordered, modified, and followed up. Thus, if the swelling is not very large, and has been two months in forming, it is very probable that two months, at the most, of active and regular treatment will cause its subsidence. If, on the contrary, it has occupied a longer time in forming, and is of considerable size, a proportionately longer time, say about four months, will be wanted. The rule is simply this, and it applies with equal force to very many other syphilitic lesions of neoplastic character, that if the cell-proliferation which constitutes the swelling is young and recent, and has not remained in the tissue framework of the part long enough to become, if we may say so, assimilated, or thoroughly incorporated, it may be quite rapidly removed without having produced structural change. If, however, the cell-proliferation has become old and thoroughly mingled with the tissue framework of the parts, its removal is slow, and certain structural changes are almost inevitably induced; the final result is better, however, if treatment is instituted, even late. In illustration of the first proposition I cannot offer a better example than that of my eighth case, in which the swelling of a metacarpal bone was quite large, and in which treatment was instituted immediately upon its development, when, being followed up regularly, full resolution was brought about in two months, leaving the bone, to all appearance, in a normal condition. Whereas the chronicity of these swellings, and their production of structural change when treatment is commenced at a late period, is well illustrated by my sixth case, in which it was instituted at the fourth and a half month of the existence of a bone-swellings of considerable size, and in which seven months elapsed before its subsidence was induced. Then, again, Bulkley's second case is an instance showing that a very long continuance of the bony enlargement, without the intervention of treatment, may result in a permanent alteration and hypertrophy of the bone, over which treatment has scarcely if any influence whatever. In this case one

bone had been affected eighteen months, and the other one year. So we may conclude that if treatment is not adopted within six months of the development of these tumors, the ultimate results are not favorable, but that more or less profound structural change will remain. It will also be seen that early treatment exercises a most powerful and salutary influence over these swellings. The natural tendency to resolution without therapeutical intervention is very slight, but still it has been observed, in a very limited degree, in some of the cases. The average duration of these swellings, then, when uncomplicated by degenerative changes or by lesions of neighboring tissues, may be stated to be about three months.

In these uncomplicated cases, as well as in those in which proper treatment is followed, the bones, as far as can be ascertained by examination, are found to be, after the subsidence of the swellings, in a normal condition; or, if they are at all altered, the changes are so slight that they would have escaped recognition unless the previous history of the case was known, so that, in general, we may take it as a rule that no serious results will follow.

In regard to the distribution of these osseous swellings, it seems that the rule is, as shown by the greater proportion of cases, that a number of bones should be affected at the same time, and that the swellings should be quite generally and symmetrically distributed. These facts are well shown by the cases in which both ankles and wrists, as well as other portions of the skeleton, are involved. Then again there are instances of more than one bone being affected, but not in a symmetrical manner; and it will even be found that in some cases a single portion of a bone is attacked. As these latter cases are not as numerous as the former, we may conclude that in the point of distribution of osseous lesions in young children, a symmetrical and quite general development is the rule; to which, however, there are certain exceptions. It would seem that in clinical practice the exceptions consisted mostly in those cases in which such bones as the phalanges, metacarpal, metatarsal, and tarsal bones were those affected. When we contrast the development and distribution of the osseous lesions in these cases, we observe that, in these particulars, they resemble very closely those of the various cutaneous lesions.

There is still another point of considerable interest relating to the development of these swellings; it is, that they usually all appear synchronously, and then run the same course. In certain very unusual instances this character is wanting, and we meet two, and even three series of osseous swellings. In these cases the first is usually a general and symmetrical development, and the second and third consist of one or more enlargements, usually, however, unsymmetrically placed. In these cases, however, the first series even may have consisted of a local and unsymmetrical distribution. According to the facts to be gathered from the records of our cases, these relapsing series have all appeared within a year after the invasion of syphilitic lesions, and at the longest time four and a half months after the development of the preceding series; generally an interval of three months elapses between each crop. A very significant fact, however, is to be noted, in this connection, namely, that in every instance in which more than one crop of osseous swellings has been observed, no treatment had been instituted. This fact points strongly to the suspicion that in many of the cases more bones than those which are detected as being involved in the morbid process are thus affected, but that treatment had removed the nascent pathological changes. In this connection it is interesting to mention again the fact that in the post-mortem observations of Wegner, Waldeyer, Köbner, and Parrot, they very frequently found gradations of pathological change, and that in the same subject the most pronounced lesions of one bone coexisted with incipient lesions in another. This fact also proves the truth of Bertin's<sup>1</sup> surmise, made so many years ago, that it was probable that syphilitic lesions would be more common than they were if treatment was not regularly followed. I have noticed, in those cases in which the osseous lesions appeared in crops, that when under treatment they disappeared, their resolution was very nearly synchronously accomplished, and that a proportionate length of time did not intervene in this process as did between their periods of development.

XIII.—THE EFFECT OF THE OSSEOUS ENLARGEMENTS UPON THE INTEGUMENT AND UPON THE JOINTS.

THE integument is usually not at all involved coincidently

<sup>1</sup> *Op. cit.* page.

with the bone-lesions, but in some exceptional cases has been found to be secondarily inflamed. The inflammatory process in it varies in intensity from slight hyperæmia to deep ulceration. The causes of this hyperæmia and ulceration are of two kinds, the one resulting from simple pressure of the bony swelling underneath, the other from the activity of the lesion of the bone. The results vary with the cause; for whereas, in the former instance, in which pressure is the excitant, a greater or less hyperæmia results, and in certain somewhat rare instances even ulceration, in the case of the severity of the inflammatory processes in the bones a lesion of continuity of greater or less intensity and of varied form is induced. The hyperæmia from pressure has been well shown in one case of extensive enlargement of a phalanx, and it is in the region of the fingers the tendency is most marked. This, of course, is due to the tightness of the investing integument, and perhaps to the excessive mobility of the parts. As the records of the various cases clearly show, swellings even of quite considerable size at the epiphyses are not complicated with dermal change, for the reason, undoubtedly, of the looseness of the covering integuments. It will be seen hereafter that, in cases of synovitis, the integument may become red and inflamed. As has been remarked already, the swelling of the bone may take place so slowly that no change is induced, as the integument accommodates itself to the gradually increasing pressure.

It might seem at first sight somewhat singular that even in cases of well-marked bony enlargement near joints, the latter structures should escape, even though the lesions are of so chronic a character; yet such is the clinical fact. A study of the anatomical peculiarities in the instances where articular complications have been observed, will, I think, afford good and convincing reasons for this. Out of all of the various clinical cases, only three joints have been inflamed, yet in certain of the cases of Parrot, in Valleix's, and Bargioni's, a total destruction of joints was found; but this will be shown, further on, to be essentially a different and more exaggerated process. The three instances are as follows: first, the elbow-joint, in which the lesion involved the whole distal ossifying surface of the humerus; second, the same joint, the lesion being an enlargement of the ossifying base of the olecranon; the third,

an enlarged tarsal bone with synovitis of the joint. When we examine the structure of the humerus at its lower end, we find that the shaft joins its epiphyses quite low down, even within the joint proper, and that the synovial membrane is reflected upon the point of junction of the shaft with the epiphyses. In the case of the olecranon process, the ossifying portions are also inclosed within the joint, at the junction of the base of the process with the shaft; the tarsal bones also are surrounded nearly to their full extent with joint structures; so that we see distinctly that the hyperæmia and cell proliferation in these instances goes on in positions where quite extensive synovial membranes exist; on which account it is fair to suppose that a sympathetic or synchronous hyperæmia is set up in this so vascular membrane, resulting from which and from movement of the parts we have effusion and its concomitant symptoms of swelling, redness, pain, and impairment of function. As these anatomical reasons are so clear, and as articular complications have not been observed when the swellings have been developed, owing to the normal relation of the parts at considerable distance from joints, as at the junction of the shafts of the radius and ulna, and tibia and fibula, we are certainly warranted in accepting them as the true explanation, and of drawing the evident conclusion that in the mild form of these osseous swellings articular complications are only liable to arise when the shaft and epiphysis unite at or within a joint.<sup>1</sup> As was remarked in a previous part of this essay, the joints of the metacarpal bones and phalanges have not been found to be implicated, yet the conclusion now deduced renders it very probable that these structures might undergo change in this position. The lesion, as judged of from clinical data, is a simple hyperæmia of the synovial membrane, and consequent effusion, which, as thus far observed, has not been very copious. There is no reason for supposing that there is any infiltration into the joint structures, such as we find in late acquired syphilis, as well as in the late form of

<sup>1</sup> This fact is also all the more clearly brought out in the history of personal cases Nos. 10 and 11; for in them the morbid processes at the junction of the epiphyses and diaphyses of the lower end of the tibia and fibula went on to such an extent that separation of these segments resulted, yet left the joints wholly intact. It must be remembered, however, that the junction of these segments is usually rather more than an inch from the joint, and that there are no synovial prolongations from it.

bone syphilis in children of various ages. The tendency of the condition is to ameliorate with the subsidence of the osseous lesion, and may be regarded as of a simple and ephemeral character.

XIV.—THE DEGENERATIVE CHANGES WHICH MAY OCCUR IN THE OSSEOUS SWELLINGS. THE SUPERFICIAL FORM.

THOUGH, as we have seen, these bony swellings usually run an indolent course, and, as a rule, subside without undergoing degeneration, there are certain somewhat rare cases in which destructive changes become engrafted upon them. As has been hinted before, these degenerative changes may be divided into two varieties, each of which has clearly defined features. In the first variety the destruction is limited to the more superficial parts of the swelling, whereas in the second, the degeneration involves its whole breadth, usually corresponding to the whole extent of the ossifying surface, in which case a separation of the epiphysis from the diaphysis occurs.

The superficial form of degeneration was observed in two of my cases and in one of Bulkley's, while the second form was observed in my tenth and eleventh cases. The bones thus affected were the tibia and fibula, radius and ulna, phalanges, metacarpal, metatarsal, and tarsal bones. As thus far observed the swellings have first reached their maximum of enlargement, and then the degenerative changes have become engrafted upon them; but, of course, cases may occur in which this complication will follow closely, or be coincident with the full formation of the swelling. The earlier features of this process are very liable, for obvious reasons, to escape observation; still, attention may be drawn to them quite early. A localized increase of the swelling is first found on the most prominent part, when very soon the integument participates in the inflammation, and fluctuation is soon felt. An opening then forms, or an incision is made which ulcerates, the ulceration usually going on until it occupies a space corresponding to the size of the necrotic spot on the bony tumor. There is no tendency, or such has not been observed, of this ulceration to increase beyond these limits. When fully developed, the parts present the following appearances: an elevation of the integument, of



greater or less height, upon which is an ulceration of varying size, from half an inch or less to even an inch and a half, and of a round or oval figure. The edges of this ulcer are undermined, slightly everted, red, and thick, while the base is of a brownish green color, formed of necrotic tissues, from which a fetid, sanious pus in small quantity escapes. The tegumentary tissues for a slight distance around are red and inflamed. The ulcer resembles very much an ulcerating gumma, and certainly might be mistaken for such. Critically examined, this ulcer presents the following points: it is of considerable depth, seemingly, at its middle, about half an inch in some cases; if its edges are moved or slid towards the bone with the tip of the finger, it will be quite distinctly seen that the latter is immovable, and this point can be observed if any portion of the edge be thus manipulated. Then if the base be carefully examined with the end of a probe, it will be found to be somewhat hard and resisting after the instrument has got through the thin film of necrotic tissue. These points distinctly prove that the ulcer has bony tissue as its base, and if we know the history of the case we may be certain that the tegumentary changes are secondary to the necrosis of the osseous tumor. It is very probable that a simple sinus may form instead of an ulcer, owing to a greater limitation of the necrosis in the bone and derma; a point which it is well to bear in mind, that we may not expect in every instance to find such ulcers as those just described. The reasons for this suggestion will appear further on.

The length of time required for the cure of the cases with these complications was about four months. Though, as I have said before, the general appearances of this ulceration, which is secondary to the osseous necrobiosis, resemble that of an ulcerating gumma, it may assume, during its course, features which might perhaps render it liable to be mistaken for a scrofulous ulcer; thus the base may become covered with more or less profuse, tough granulations, and the edges may assume the callous purple appearance of scrofulous ulcers, and become markedly everted. In this event I can readily suppose that it would be classed as scrofulous. Yet if the history be carefully looked into, these adventitious appearances will be explained. This further complication is only liable in case of neglect and delay of treatment. The resulting cicatrix may be of variable

appearance, either thin and depressed, rendered uneven by fibrous bands, or adherent to the bone.

XV.—THE SEPARATION OF THE EPIPHYSES FROM THE DIAPHYSES.

THE most extensive form of degeneration of these osseous swellings, in which there is a separation of the epiphysis from the diaphysis, appears also to be the rarest in clinical practice. This feature has only been observed in two of my cases, and they are, at present, unique in literature, there being no other recorded cases. But in many of the cases of Wegner, Parrot, Waldeyer, and Köbner, as in those of Valleix and Bargini, a distinct separation of the epiphyses from the diaphyses was found. In each of these cases, however, the child died at or soon after birth; consequently, with the above exceptions, we have not a case which has been followed up until a cure was effected; and, of course, these are the only ones from which the peculiar and very interesting clinical features can be studied. Many interesting points in clinical practice have been simplified, or have been thoroughly explained, by the details derived from the *post-mortem* examination of the various cases just alluded to, of which the importance can scarcely be over-estimated. There is no peculiar or distinguishing feature to be observed in the early part of the course of this variety of swelling, except, perhaps, that it attains its maximum size in less time than is required by the first variety. A phlegmonous inflammation of the integument rapidly follows, and if the parts are examined at this time, or shortly after, the following features will be observed: the swelling is not as distinctly limited to, nor does it begin as abruptly just above the commencement of, the epiphysis as it does in the simple or resolute variety. On the contrary, it commences on the shaft, just at or above its middle portion, in an almost imperceptible elevation, which gradually expands until it reaches the epiphysal region, where it becomes a distinct, large swelling. It is very probable that the swelling is at first localized in a similar manner to that in the first variety, and that the enlargement of the shaft further up occurs later. The reason of this will be clearly brought out by *post-mortem* facts. I give the appearances as they were observed in my cases, and they are those which I think will be most generally found at the early and

late periods of the development of these swellings. Very soon it is found, as I have said, that the integument has become involved; that it is less supple, and cannot be moved over the bony tumor beneath; if carefully manipulated it will be discovered that the focus of the tegumentary inflammation is at or about the point of junction of the shaft with the epiphysis; softening may perhaps be traced nearly round it, if a part such as the arm or leg be involved. In my case the fluctuating spot was found just over the malleolus, but it was evident that a nearly similar condition existed all around the limb; consequently the spot where the abscess points may be seated anywhere around the limb. As the changes in the overlying tissues are the direct result of a deep-seated destructive process, an appropriate examination will at this time reveal the character of the latter. Deep pressure shows that the bone swelling has become more prominent at the junction of the shaft with the epiphysis; and a softening, or perhaps a feeling of fluctuation, is at this time or soon after felt. The examination being carried further, supposing that the morbid processes have reached their height, abnormal movements may be produced in the parts. Thus holding the foot and the epiphyses (we will suppose the lesion to be developed, as it was in my case, at the lower end of the shafts of the tibia and fibula) firmly in one hand, and with the other grasping the shafts of the bones, it becomes very evident that a slight bending movement is permitted between the two segments of the bones just mentioned. If a lateral motion is made by attempting to slide the surfaces over one another, the lower segment moves slightly in either of the directions, and when the same is attempted in an antero-posterior direction, it is found to be very slightly accomplished. The sliding movements are generally attended with a crepitation of a soft kind, and not at all dry or harsh. This sound, however, may not be elicited, or it may be very faint indeed. In one instance the sensation appeared to me as if two soft bodies were gently rubbed, the one over the other. Its absence or masked condition may be accounted for by the intervention of the products of degeneration between the two ends of the bony segments. This was well shown by my first case; for before the contents of the abscess, if we may so term it, were evacuated, crepitation was very slight, but immediately after the operation it was very distinctly heard: so I

think that the explanation given is the true one. As the parts are naturally soft and succulent, it is very probable that this sound will always be of the soft variety just mentioned. The movements will, of course, be of greater or less extent, but it is very probable that they will always be more free in a lateral than in an antero-posterior direction. They will, of course, depend upon various causes; thus the greater the amount of tissue degeneration which exists between the two segments, in that proportion will the movements be greater; then again, the greater or less thickening of the periosteum which we shall find to be thus affected in this lesion, will act in varying degrees as an impediment to motion. Finally, the infiltration of the surrounding integument will also tend in a measure to prevent it. In the case which serves me as the text of this description, the integument over the swelling did not fall into extensive ulceration, but only enough of it was destroyed to allow the exit of the products of degeneration, and a sinus was formed. This sinus presented no very peculiar features; its orifice became thickened by fibrous tissue somewhat after the form of similar openings leading to inflamed ganglia in strumous subjects, but there was less tendency to the invasion of the surrounding tissues, and there was not any puckering of the integument. One case, however, will not constitute a rule, particularly as the tendency to neoplastic fibrous growths of the skin varies so largely in different persons, even in those free from any blood disease. So we may find in these cases the typical sinus observed after scrofulous abscesses. In my first case the little patient was a mulatto, and I should not have been surprised at such a development in her, as her race is so liable to such growths. We find both in hereditary and acquired syphilis this tendency to the development of fibrous tissue in sinuses or scars. The fact that severe ulceration was not induced, and that a sinus was formed, is of considerable clinical interest, as it shows that we need not of necessity have ulceration of the integument of such extent as has been described as accompanying the first form of degeneration of these bony tumors. So we must accept these clinical facts as being liable to be observed in these instances: first, a circumscribed ulceration; second, a sinus of the skin. In my second case of this lesion a sinus was formed, but owing to treatment it rapidly closed before sufficient time had elapsed for

fibroid proliferation to occur. It is interesting to note that a sinus rather than an ulcer was produced. Passing now to the course followed by these severe bony swellings, we find that, under appropriate treatment, the enlargement gradually subsides, that, after a time, the viscid secretion, which, however, towards the end becomes of a purulent character, ceases to escape, that the sinus closes, and, finally, that scarcely any evidence is left of pre-existing bone lesion.

The secretion which escapes is, as said before, quite thick in consistence, of a light brown color, of neutral reaction, and found, by microscopic examination, to contain leucocytes in considerable quantity, a few myeloplaxes, and granular matter. Like all productions of degenerated bone from syphilis, in an uncomplicated case, it is free from pus when first evacuated, though this may appear later on. We have seen, that, in this form of extensive bony degeneration, lesions of continuity have been produced in the periosteum and in the integument; but the details of my tenth case prove distinctly that the bone changes may be almost of the same severity, and yet that these superficial tissues will not undergo any ulcerative action whatever beyond those absolutely necessary to give vent to pent-up secretions. In my tenth case, upon one leg the epiphyses of the tibia and fibula were found to be completely separated from the shafts, yet there was no extrusion of the products of degeneration, nor did an opening upon the surface occur. This fact is of great clinical interest, and its knowledge is very important in the matter of prognosis. It proves distinctly that the degenerated *débris* of bony and cartilaginous tissues may be absorbed, probably by undergoing at first fatty transformation, and that, coincidently, or in a short time afterward, the normal nutrition and growth of the bone are restored. I examined my case in especial reference to this point, and I convinced myself thoroughly that this absorption had taken place without any lesion of the periosteum. One of the most interesting features of this form of lesion is the part which is played during its course by the periosteum—a part which, besides being interesting, is of vital importance, as influencing the final result. As I observed in my case, and as the facts observed at the autopsy of Valleix's and Bargioni's cases further support, this membrane undergoes very considerable

thickening coincidently with the active and severe degenerative changes which are developed between epiphyses and diaphyses. This thickening is, as we have seen, not localized exactly to the seat of bone inflammation, but it extends quite a considerable distance up the shaft. The result is that a very thick tube of bone is formed under the periosteum, and that it serves to give stability to parts which have been so materially weakened; when, acting as a splint, it tends to prevent motion, and in a measure keeps the parts from further disorganization. Of course, if this sub-periosteal tube was only formed just over the morbid focus, it could not give the power of support which it does, as it extends quite far up. In fact, during the height of activity of the destructive processes this wise provision of nature is the chief, if not the only, means of averting total disorganization of the limb, and it exerts an equally important influence upon the final result. Then, coincidently with the absorption or extrusion of the softened tissue, bony formations jut inwards between the two detached ends of the segments of the bones, upon which an healthy nutrition soon becomes engrafted; till, in the course of time, the two become gradually welded together, and, on the morbid processes ceasing, scarcely anything abnormal can be detected in the parts. In my case a mere ridge of about the breadth of one line was noticed, and the thickening of the periosteum gradually subsided as the parts assumed a normal condition. The length of time required for the cure of this severe form was, in my first case, six months, being about one-third longer in course than that of the simple uncomplicated swellings. In the second case which I observed of this lesion, the reparative process was established within two weeks, or rather disorganization was averted in that time, and from the appearances presented by the case at my last examination, I think that a perfect cure would have been brought about in three months; so that I think we may conclude that, in such cases, from three to six months of treatment are required to restore the parts to as near a normal condition as we by our art can hope to attain. Now, though these cases show us that disorganization of these bones and joints may not occur, a perusal of the cases of Valleix and Bargioni also show that certain rapidly destructive changes may supervene, and that these tissues and organs may undergo disorganization.

In these cases the epiphyses are extruded, the joints are wholly destroyed, and the limb, left in a state of permanent deformity, is more or less useless in its function. As thus far observed, these complications have only occurred in cases attended with a fatal result, and we have no record of a recovery under the circumstances. In these instances it is probable that death was induced principally by the visceral lesions with which the child was afflicted, and was perhaps accelerated by the systemic reaction incident to such profound reflex disturbance as must exist in such a case, and by the exhaustion consequent upon so great a drain upon the system as such extensive tissue destruction would entail. But as we know that in children not suffering from syphilis this condition may exist in its severest form, and yet not compromise life, we may assume that in cases of syphilis in which visceral lesions do not exist, or are mild in character, that even this severe form of destruction may occur, and yet the child live.

The separation<sup>1</sup> of the epiphyses from the diaphyses may occur in any of the long bones of syphilitic children, but the facts observed by the German observers, and by Parrot at *post-mortem* examinations, seem to show that those of the arms and legs are most liable to be thus affected, and that the proximal and distal ends are thus liable in about the same proportions.

This accident or complication is accompanied by certain well-marked subjective symptoms, which may be summed up concisely in the words, inability to move the affected members. These symptoms were very much dwelt upon by Parrot, and also by Guéniot;<sup>2</sup> but I think that the former attaches more importance to them than they really deserve. Thus he entitles

<sup>1</sup> I find it stated by Parrot (op. cit.) that Underwood says "that a looseness of one or other of the articulations may be accepted as very probable indication of syphilis," and he makes the suggestion that perhaps the English observer had met with cases of separation of the epiphyses from the diaphyses in syphilitic children. Parrot quotes from the translation of Underwood's work, "*Traité des Maladies des Enfants, traduction Française.* Paris, 1786, page 361." I have been unable to find this edition of the work; but in the ninth edition of it, edited by Marshall Hall, and published in London in 1835, I cannot find this sentence.

<sup>2</sup> *Gazette des Hôpitaux*, Feb. 9, 1869. This observer reports a case which Parrot uses, and I transcribe it as No. 1. Guéniot did not report it at the time as being syphilitic, but afterwards, at the suggestion of Parrot, arrived at the conclusion that it arose from that disease.

his three articles after them, calling them a pseudo-paralysis, caused by an alteration of the osseous system in newly-born children affected with hereditary syphilis. This false paralysis is simply an indisposition or want of power to move the limbs, owing to a false point of motion existing in their continuity. The same features are observed, and the same conditions obtained in cases of fracture of bones, and as they are explained in so simple a manner I hardly think it necessary to so magnify their importance as to burden literature with another name for them. The appearances presented by children whose bones are thus affected, vary, of course, with the particular one involved, as with the end which is involved, and are in the main those which would be observed if any of them were fractured, except, perhaps, that there is much less sensitiveness and swelling of the surrounding parts generally. In one of Parrot's cases, and I must acknowledge that he has observed and recorded his cases faithfully, and that his contribution is one of considerable value, the arms hung heavily down as if paralyzed, the hands being turned towards the trunk. In my tenth case the legs hung down in a powerless manner, and the feet turned in to such a degree that they rested fully on their inner sides. Owing to the existence of a false joint, or rather false point of motion, there is a total relaxation of the muscles, and no movements are made in the limb; certainly, there are none in that part in which the bony levers are divided into two, whereas in the upper division of the limb, as the thigh or arm, slight movements will be observed. When the parts are handled (to speak from a clear recollection of my cases), they, if moved to their normal position, quickly return to the position they abnormally assume; thus, when I everted the foot, it remained so while held, but, immediately that I loosened it, it tumbled over heavily upon its inner side. I think that this same motion would be observed in the hand. When the hands or feet are tickled or pricked, a slight convulsive motion is induced in the muscles, but mostly so in those of the upper and unaffected region. Parrot says, very happily, that in one of his cases a jerking motion was produced similar to that seen when a jointed toy is pulled by a string. This fact goes to show that the muscular power is temporarily in abeyance, and that if stimulus be applied to the members a disordered and jerking movement



results. When improvement begins in the osseous lesions, particularly if the parts are subjected to judicious use, this condition gradually disappears, and when the continuity of the bones is complete again, the muscles move these levers in perfect harmony of action and co-ordination. This general suggestive description will answer for almost any case which may arise, the features of course differing according to the conformation and function of the bone affected.

It is well, however, to describe the features observed in my eleventh case, the second one in which I found separation of the epiphysis from the diaphysis. In this an unusual bending of the lower part of the leg inwards was found, the part which allowed and induced this abnormal position being at the junction of the lower third of the tibia and fibula with their epiphyses, the convexity of the resulting bow looking outwardly. This condition was due to the preponderance of action of the flexor muscles over the extensors, which, drawing upon the lower segments of the bones of the leg in which a false point of motion existed, produced the deformity noticed. In the present instance this deformity was slight, but of course it may be very extensive. As a slight bending is noticed as the normal condition of the legs of children, so it is well to look into the condition carefully if it exists, and to make comparisons with the healthy leg, or with that of another infant, as by this means false conclusions will be avoided.

#### XVI.—THE SYMPTOMS INDUCED BY THE OSSEOUS SWELLINGS.

When we consider the severity of the pain which so frequently accompanies the development of osseous and periosteal lesions in the adult, we naturally conclude by analogy that the various osseous swellings in infants have been attended with pain in their development and course. The comparison, however, is not a perfect one between the two cases, for in the first instance the lesion is an inflammation in a fully formed, dense, unyielding structure, whereas in the latter the lesion is mainly an abnormal nutrition attended with inflammation, but in a nascent structure, as yet soft, unfinished and yielding; so that in infants there is a probability that as the conditions are altered the amount of pain may be less. This opinion or supposition is based on the fact which I was careful to elicit from

the mothers of the various children, that they did not notice any very unusual suffering of the children. Some were quite restless at night, and appeared as if in pain; but it is well known what diverse and erroneous conclusions may be and are formed under these circumstances, which often leave us at a loss to say whether or not in these very young children these lesions are attended with pain. I endeavored to ascertain the fact, from several of the mothers, whether manipulation of the swollen parts gave uneasiness at night when the child seemed restless, but I could not obtain satisfactory information. When examined in an uncomplicated state I have not found these swellings to be the seat of pain, particularly those of the diaphyso-epiphysal junction of the long bones; indeed, I have been surprised at the unconcerned manner of the infants when I have been very carefully manipulating them. Still I saw a marked exception to this in the case of a child under the care of Dr. Dessau, the history of which I shall give further on. In this instance the restlessness and evident pain of the child caused its mother to bring it to the Dispensary. Here the typical lesions of syphilis were found. Manipulation of the swollen fingers and of the expanded distal ends of the forearms was evidently attended with acute pain, as the child shrank from the examination. The mother thought that the pains were more severe at night. In the instance of the child with nodes on the frontal bone, I thought that there was considerable sensitiveness, as it shrank from my grasp. This fact I have also observed in cases of enlarged phalanges; so that I have derived the impression that when the swellings are found upon the bones of the head and upon the phalanges and their neighboring bones, considerable pain and tenderness exist, but that on the long bones very little, if any, is as a rule observed. So that, though it is very probable that pain is a concomitant symptom of these swellings, the demeanor of the children does not manifest it in the majority of cases. Moreover, in this connection, we have an important witness in my eighth case; in which there were lesions of the metacarpal bones and of the long bones at their diaphyso-epiphysal junction, for in it we have unmistakable evidences of very severe pain. This case is one of acquired syphilis in a child four and a half years old, in whom osseous lesions precisely similar to those of infants were ob-

served. Now this child complained bitterly of her pains, and was old enough to describe them, and to distinctly localize them at the points where osseous enlargements were found. Moreover, they observed a nocturnal recurrence, not being felt during the day; and so much did they resemble those of the child's father, that he himself suspected their syphilitic origin. This being indubitable evidence, the question arises, how does this affect the negative evidence which I have already brought out? Bearing it in mind, from the fact that many of the infants seemed fretful at night, I am inclined to think that these osseous and periosteal swellings in them are attended with pain. When the various osseous swellings undergo the superficial form of degeneration, it is probable, as the destruction of the superimposed epidermis is very slow, and is not of a phlegmonous nature, that the pain is very insignificant; but if, owing to the rapidity of the osseous degeneration, it does assume a phlegmonous nature, it is probable pain will be present.

I have already shown that the subacute mode of development is the one usually observed when the epiphyses become separated from the diaphyses, so that I think it may be assumed that this whole process might be accomplished with very little pain and a surprisingly slight amount of systemic reaction. Yet I can readily see that if the process should assume the rapid form which has been observed, that it would be attended with pain; indeed the details of the various cases of other observers render this supposition very probable. In this form the inflammation of the integument is of a rather more phlegmonous character than the more superficial variety, and of course attended with more or less pain. When a separation of the segments has occurred the pain will be due to the abnormal condition of the parts, and although, perhaps, it is not spontaneously present, any movements, voluntary or involuntary, will, as a matter of course, give rise to it.

When the bony tumors have reached such a size that injurious pressure is exerted upon the integument, then pain becomes a complicating feature, and exists in proportion as the pressure induces disorganization of the integument. In several instances in which the phalanges have been very much swollen, and in which much cutaneous hyperæmia existed, I

found by examination very considerable pain and tenderness. In the event of synovial complications, it is very probable that pain of an acute character will be present, and in three instances I have seen this condition very well marked. These latter conditions which induce pain are, however, merely secondary in their nature, yet, in order to make our study complete, it has been necessary to consider them at some length.

#### XVII.—THE PERIOSTITIS OF THE HEREDITARY SYPHILIS OF INFANTS.

In our previous study we have found that periostitis, as a complicating lesion in hereditary syphilitic children, occurs quite frequently. Thus, in the complex lesion of the fingers, it plays an active part; it is also the essential lesion in the nodes of the cranium; it is developed, as a concomitant lesion, to a greater or less extent, in the diaphyso-epiphysal swelling, and in the separation of the segments attains considerable extent. Yet have we not met with any case of its development in the form of distinct circumscribed swellings along the shafts of the long bones, after the manner observed in acquired syphilis, and also as observed in late hereditary syphilis. This form of swelling is admitted by many authors; but, as I have shown by giving all the cases, not one of which contained an instance of such, it is fair to presume that it is rare. Mayr<sup>1</sup> distinctly says that he has seen such swellings, and many other authors speak to the same effect. Yet, as cases are not brought forward, I am disposed to think that allusion has been made to swellings of the diaphyso-epiphysal junction, or perhaps to nodes. As I have already stated, Bertin<sup>2</sup> says he has seen cases of periostitis and of exostosis, and, as an example, details a case of osseous swelling at the great trochanter of the femur. Indeed, I am in accord in my views with those of Mr. Jonathan Hutchinson,<sup>3</sup> who has studied infantile syphilis with an unusual care and zeal. He thinks that periostitis, rare in infancy, is quite common in childhood. The very severe and extensive osseous lesions found after death by Wegner and others were chiefly those of

<sup>1</sup> Ueber Syphilis hereditaria, Separat-abdruck aus dem Jahrbuche für Kinderheilkunde. Wien, 1862, page 7.

<sup>2</sup> Op. cit. p. 360.

<sup>3</sup> New Facts and Opinions as to Hereditary Syphilis. London Hospital Reports, vol. ii., pages 175 and 176. London, 1865.

the points just alluded to ; but the former says that he found localized periostitis, and, as we have already seen, he observed this lesion in a very peculiar and diffuse form upon the cranial bones. Although in some of his cases this inflammation is described as involving the greater parts of some of the shafts, it was in reality only a complication and perhaps an extension from continuity of surface of the epiphysal lesion, and did not exist unconnected with it. In a recent work on infantile syphilis, M. Violet,<sup>1</sup> gives the statistics of the service of M. Gailleton in the Antiquaille Hospital of Lyons for a period of one year, in which he made autopsies upon thirteen syphilitic children, besides which he gives five made by his friend, M. Poncet, making a total of eighteen cases. Out of this number he found the diaphyso-epiphysal lesion six times ; but makes no mention of having observed any periosteal swellings. Clinically, the lesion in the form spoken of is rare, though of course it may occur. I hope to be able to show, in a future work, that periostitis of hereditarily syphilitic children, as of adults, is not at all uncommon, and that it may then reach an excessive development. We shall see further on, as indeed we have already known in a negative way, that in infants the lesion is of a proliferating variety, or rather that it is a simple hyperplasia of periosteal tissue, but that the lesion of older subjects may be accompanied by gummy infiltration, though it is very often wholly of the hyperplasic form. It is evident that Lancereaux<sup>2</sup> has not observed periostitis in hereditary syphilis, as he makes no mention of it, but he speaks in the first edition of his work of having once observed the peculiar separation of the epiphysis, such as we have studied. Considering the attention which this observer pays to the study of morbid anatomy, his silence on this particular point is significant. Very recently Poncet<sup>3</sup> has published the result of his investigations into the bone-lesions of hereditary syphilis. Out of twelve cases he found the diaphyso-epiphysal lesion nine times, and he confirms the observations previously made. He does not speak of periostitis in an uncomplicated form.

<sup>1</sup> *Etude pratique de la syphilis infantile*, page 44. Paris, 1874.

<sup>2</sup> *Traité historique et pratique de la syphilis*, page 550. Paris, 1866.

<sup>3</sup> *Progrès Médicale*, page 237. Paris, 1874.

## XVIII.—THE EFFECTS OF THE OSSEOUS LESIONS UPON THE ULTIMATE STRUCTURE AND SHAPE OF THE BONES.

As can be readily seen there are certain difficulties, and I might almost say impossibilities, in tracing the results in later years of the lesions of the bones with which the infant was afflicted. Yet a determination of their condition after the subsidence of the lesions is a study at once interesting and important, as from it we may deduce facts or indications both as to treatment and prognosis.

The recent very able and exhaustive clinical and experimental researches of Ollier,<sup>1</sup> and the clinical studies of Poncet,<sup>2</sup> have done very much to increase our knowledge of the effects of inflammation, in its various stages, upon the growth and development of bones. These studies may be practically applied to the cases under our consideration. One of the main points which these authors have proved is, that inflammation without destructive change taking place at the junction of a shaft with its epiphysis, results in augmented growth and length of the bone. Several of the foregoing cases are peculiarly appropriate examples for the determination, clinically, of the truth of this view or hypothesis. My observations of the cases, with a few exceptions, have been confined to the period of existence and decline of the osseous lesions, a period at which conclusions cannot be drawn.

I am inclined to think, however, that it will be difficult to settle this point satisfactorily in the long bones, as the lesion is so often developed symmetrically; whence it results that we have no proper standard of comparison, and also because the amount of increased growth must, under any circumstances, be scarcely appreciable. I examined my second case a year after the cessation of the morbid processes, but could not discover any increase of length. It is very probable that if the lesion is treated early and efficiently, no appreciable change will be induced, but that, if allowed to run its course, it will exert an influence over the future size of the bone.

Inflammation with destructive change at the diaphyso-epiphy-

<sup>1</sup> *Traité expérimental et clinique de la régénération des os.* Paris, 1867.

<sup>2</sup> *De l'ostéite envisagée au point de vue de l'accroissement des os.* Gazette Hébdomadaire, Nos. 42, 46, and 49. Paris, 1872.

sal junction is known (having been proved by these observers) to produce arrest of development longitudinally. Therefore, in the case of separation of these segments, we should expect that, as the inflammatory processes are severe and destructive, the influence upon future growth would be proportionately manifest. This point is of especial interest in the question of prognosis. It prompted me to follow up the little patient in whom this lesion was so well marked, and two years and a half after her cure I examined the bones of the legs carefully; but could not perceive that an arrest of development, however trifling, had been induced. As compared with the length of the other long bones, these seemed normal, the child being fully as tall as it should have been at the age of three. I am inclined to think that the prompt and efficient treatment instituted averted such structural changes as would have interfered with the future growth of the bones. As we know that bone is constantly formed, during its periods of development, by the ossification of a layer of cartilage of greater or less breadth which exists between the shaft and the epiphysis, and which is probably replaced as fast as used up by cell-growth from the proximal end of the epiphysis, it perhaps happened that in this instance this layer was not wholly destroyed, or that it was replaced in the natural condition, and that the process of ossification began again in a normal manner from the shaft. Had it happened, however, that a bony cicatrix had been formed at this point, it can be readily seen that all future ossification and longitudinal growth would either have ended, or that it would have been very slight. This explanation is, I think, the most rational of any which can be given, and is in perfect accord with our physiological and pathological knowledge. It is now a definitely settled fact, that chronic inflammation alone of the shaft of a bone may cause its elongation. As we have found such inflammation affecting the metacarpal and metatarsal bones and phalanges, we should naturally look for such a sequela. As these bones also have an epiphysis, and as their whole length is usually involved in the inflammatory process, it is probable that the increase of their length is due to two causes; first, the inflammation of the diaphysis; second, that of the epiphysis. In my case, number six, the lengthening of a phalanx was fully one-eighth of an inch more than normal, the result of

an inflammation of six months' standing. For so short a bone this increase is certainly very considerable. I have seen an instance of a phalanx being enlarged longitudinally fully half an inch in a patient fourteen years old, the victim of hereditary syphilis. The case was shown at the February meeting, 1874, of the New York Dermatological Society, by my friend Dr. E. L. Keyes. It also presented other very interesting osseous lesions. The inflammation of the shaft, however, may be attended with considerable destructive change, and still increased length may result. I have learned from observation of my cases that, in every instance in which chronic inflammation has involved a shaft, increased length of the bone does not necessarily result. Thus, I have seen two instances in which, after the cessation of the chronic inflammation of a short bone, its length was materially shortened, and this without any destructive change. Perhaps this feature is to be explained by the fact that the cartilage at the end of the shaft was very early and rapidly ossified, and thus that thereafter the ossific matrix was not in the condition for copious bone-proliferation.

Increase of diameter will also be observed in some cases, the amount of which will vary with the duration, and perhaps intensity, of the inflammation. In the cases of the phalanges, metacarpal, and metatarsal bones this feature can be very well observed. When the irregular bones have been enlarged, their ultimate condition may be that of greater or less enlargement, seldom that of very marked diminution.

These, then, are the main sequelæ of these bone-lesions of children. But what has thus far been said, refers in the main to instances of inflammation uncomplicated with destructive change. When necrosis or caries complicates the inflammation, the ultimate result varies with the extent and situation of the process, of which it may be said succinctly that deformity and diminution of size are the result. Thus I have seen a metacarpal bone very much attenuated at its centre, a phalanx flattened laterally, and a tarsal bone rendered smaller and irregular in shape. In the one instance of nodes upon the cranium, there was a decided loss of tissue. Now it is necessary to state here, in anticipation, that these sequelæ result from an inflammation which is more closely allied to the simple form than to syphilitic inflammation. In the early stages of hereditary syphilis, the



osseous lesions are usually unattended with the proliferation of gummy or granulation-tissue, and, as has been said, partake in their nature of the character of simple osteitis, consequently having their sequelæ similar to those of this latter affection. Later on in hereditary syphilis, however, the proliferation of granulation-tissue becomes a complicating part of the process, when, of course, the sequelæ are different. Thus, whenever this tissue is proliferated, there is a liability to its degeneration, as also to its final absorption; in which events destruction of the bones, of greater or less extent, result, when the sequelæ may be summed up as a loss of tissue. In these cases the inflammation is generally of a mild character, and the sequelæ of the more simple form of the process, such as lengthening of the bone, are not generally induced, though of course, in exceptional cases, they may be. In some instances, somewhat rare however, of infantile bone-syphilis, gummy tissue is proliferated, in which cases the final condition of the bones would be such as has just been stated. This fact, as to the difference in the nature of the lesion in early and late hereditary syphilis, is only introduced here incidentally to render intelligible this portion of our study; a fuller consideration of it being reserved for the section treating of pathology.

In the consideration of these sequelæ, it is interesting to bear in mind that they are, in many instances, to a great extent, if not indeed wholly, preventible by the early adoption of an appropriate and active treatment: a fact upon which attention should be especially invited, as pointing to the prevention of degeneration and deformity of the bones.

Bouchut<sup>1</sup> speaks of an extraordinary hardness of some of the long bones which he has found in syphilitic children either prematurely born or at term, a condition which he attributes to an abnormal activity of development, and which process, he thinks, is of the same category as the plastic infiltrations into the other organs. I have been astonished at the harmony of statement of a number of observers who deny the syphilitic nature or origin of this condition. Waldeyer and Köbner say positively that they have observed the same state of the bones of children

<sup>1</sup> *Traité pratique des maladies des nouveaux nés, des enfants à la mamelle, et de la seconde enfance.* Sixième édition. Page 1061. Paris, 1873.

who were not syphilitic. It is probable, then, that this condition is not at all due to syphilis, though it suggests the point, that, in consequence of inflammation of the bones of hereditarily syphilitic children, we may have a sclerosis of the tissue resulting as a sequela; but in that event, it must be subjoined that there would be nothing specific in its nature, as this condensation of tissue is one of the recognized results of every variety of inflammation. I have no doubt that it existed in several of the bones which I have seen after the cessation of the inflammatory process, but owing to their small size I was unable to determine the fact. We may, therefore, add to the other sequelæ of these osseous lesions, a sclerosis of the bones.

#### XIX.—THE PERIOD OF INVASION OF THE OSSEOUS LESIONS.

The facts which have been observed by Wegner and Waldeyer and Köbner prove beyond a possibility of doubt that the bones are affected by syphilis in intra-uterine life, it being very probable that the syphilitic impress is stamped upon their development just at the time when it is most active. Since, in clinical practice, we find, as a rule which can be laid down with considerable precision, that the swellings of the bones appear shortly after birth, so it may be that the cell changes which constitute them begin before birth, though but recognizable, or recognized, some time after. Out of ten of my cases the existence of osseous swellings was noticed in six at about the sixth week of life; and this was about the period at which similar lesions were observed in the cases of Ranvier, Archambault, Bärensprung, Bertin, Fournier, Valleix, Bargioni, and in Bulkley's first case. In one of these the period was three weeks, and in another thirty-six days. In two of my cases the swellings were not observed until the child was three months old, while in Bulkley's second case the child was fifteen months. These figures indicate clearly the very early development of this morbid process, and suggest what we shall find is borne out by pathological histology, that it is essentially connected with the development of the osseous system, and is consequently most prone to appear early in life, when this system is undergoing the most active morphological changes.

In the cases of Wegner, Parrot, Waldeyer and Köbner, Valleix and Bargioni, as has been said before, the swellings were

found either in still-born children, at birth or shortly after. They were very extensive, and were complicated in many instances with profound degenerative changes. The children were afflicted with the severest form of syphilis, the visceral lesions being very extensive. Wherefore, we must take these as exceptional cases; as examples of the severest form of this syphilitic lesion; and must attribute the somewhat precocious evolution of the enlargements to the great activity of the disease. The cases, such as we are likely to meet in clinical practice, and which may be considered as typical in their nature and course, are my own and those of Ranvier, Archambault, Bertin, and Fournier. It is a fact of some importance, that in the greater number of cases in which the lesions appeared at about the sixth week, the swellings were more numerous and more symmetrical than those which appeared later. A comparative perusal of the cases will bring this point out clearly. We, therefore, may lay down, as a rule, that these osseous lesions are developed at about the third to the sixth week of life, or that period in the history of hereditary syphilis when, in consequence of some unexplained cause, we notice an explosion or rather general manifestation of syphilitic lesions and symptoms, in a child who previously, perhaps, had shown no evidences of the disease; that, in a smaller number of cases, these osseous affections may develop late in the first year, and even during the second or third; and that, in these later periods, there may be, and usually is, an absence of symmetrical distribution, with a number of swellings much less. There may, however, be exceptions to these last qualifications. We are unable to offer an explanation of the fact of the limited extent of development of the lesions at this age of the child, except it be in the waning power of the virus.

Passing beyond these years we may find these inflammatory or irritative lesions, but the rule is then that they appear of another order, and, in fact, essentially the same as those of late acquired syphilis.

**XX.—CAN SIMILAR OSSEOUS LESIONS BE DEVELOPED IN ACQUIRED INFANTILE SYPHILIS?**

We come now to a point in the etiology of these bony tumors which is of the utmost doctrinal importance, as well as of

practical interest. Thus far, I have always alluded to hereditary syphilis as their cause; now the question arises, can they be developed in the acquired syphilis of infants? Let us look at this question in a comparative light. An infant who has been born in a healthy condition, and who afterwards becomes infected with syphilis, is certainly not as profoundly syphilitic as one who inherits the disease, and who may be said to have never possessed an healthy organism and nutrition. In the first instance, it is probable that the manifestations of the disease would be mild and superficial, and would only involve a limited number of tissues, while, in the second, the extreme of the manifestation might be looked for. So that we should expect, by analogy, that tissues which usually escape in mild forms of syphilis, might escape in this instance. Other than this, I know of no reason for assuming an immunity to bone-lesion in acquired infantile syphilis; on the contrary, our knowledge of the malignant type which this disease sometimes assumes in its acquired form in the adult, points out to us clearly that it may likewise invade the more delicate and immature organism of the infant; so that I think there is no lesion of syphilis which may not be developed in the infant who has by any chance acquired the disease. As these lesions are intimately connected with the natural morphological conditions of the bones, it is necessary for their development that the child should not have reached the age when these changes have ceased, at which time, of course, it would be no longer susceptible of morbid impress. I take the pains to consider this subject at some length for the reason of its intrinsic interest, and also from the fact that such eminent observers as Waldeyer and Köbner assert that this form of lesion is the exclusive appanage of hereditary syphilis. I think that these observers have arrived at this conclusion from the facts, first, that they are disposed to regard such swellings, when they occur later than the early months of life, as due to rickets; and, secondly, because at the autopsy of a case of syphilis acquired by vaccination, Köbner<sup>1</sup> found that the osseous system was normal. I think I can show that they are partly mistaken as to their first reason, and I shall certainly show, by

<sup>1</sup> Die Übertragung der Syphilis durch die Vaccination. Archiv für Dermatologie und Syphilis. Zweites Heft, p. 147. 1871.

the details of two cases, that similar lesions of the bones have been found in acquired infantile syphilis. In the entire range of medical literature I am able to find but one recorded case; though, of course, others must have occurred that escaped observation; my eighth case being the second example. These two cases will show beyond a doubt, I think, that these irritative or inflammatory bone-lesions may be caused by acquired syphilis. The first case is that of Roger, the details of which have been given already. The situation and course of the osseous lesions in this case are such as show clearly that they belong to the same category as those of all the other cases. It will be noticed, however, that although symmetry of development is shown, there is not that tendency to a general distribution which some of the cases show so clearly. In my eighth case the lesions were of the inflammatory order peculiar to those of infants, and though identical bones were not symmetrically involved, there is an evident invasion of the bones of both sides of the body, showing a tendency to symmetry. Summing up these two cases, then, and comparing them with the typical ones which we have studied, we observe that the lesion is of the same inflammatory nature, and shows the same tendency to involve the diaphyso-epiphysal junction of long bones, and the whole length of short ones, in the same manner that we observe in infants. We may assume, then, that the processes are identical; whence these cases prove conclusively that these peculiar osseous lesions may result from both the hereditary and acquired syphilis of infants. It is almost needless to call attention to the fact that the lesions in these cases did not resemble, either in their evolution, course, or decline, the bone swellings due to gummy infiltration. It may happen that hereafter cases will be found of acquired infantile syphilis, in which the distribution of the lesions is as general and symmetrical as those of the hereditary form. This condition would undoubtedly be dependent in a great measure upon the time of development of the lesions. Thus, if the infection occurred soon after birth, the lesions would, perhaps, be similar in their distribution to those of hereditary syphilitic infants, for at this time of life the osseous growth is most active; should, however, infection occur later, a more sparse and unsymmetrical development would, perhaps, result. This view is drawn by analogy from our knowledge of

the course of the lesions in hereditary syphilis, and of the mode of development of the osseous system. We must also take into consideration, as regards the less pronounced character of the lesions, and their comparative infrequency in acquired infantile syphilis, that the infection is very probably much less intense than in the hereditary form. Again, there is another point of much importance in this connection, namely, that of the greater or less tendency, or even immunity, to the action of syphilis possessed by the infant.

XXI.—THE INTENSITY OF SYPHILIS IN THOSE CASES IN WHICH OSSEOUS LESIONS ARE OBSERVED.

The histories of all of the cases, without any notable exceptions, show that the concomitant manifestations of syphilis upon the organism generally, and upon other tissues than that of the bones, were well marked; proving that the disease was in a quite active stage. As the concurrent testimony of all the cases points so clearly to this fact, it is unnecessary to dwell any farther upon it; and I think we are warranted in drawing the conclusion from it, that, in infantile syphilis, osseous lesions are generally met with in those cases in which the disease, if not severe, is yet active. It is almost unnecessary, however, to state, that even in this severe or active condition of syphilis, osseous lesions may not develop, as it is quite probable that they will not be observed in very mild cases; yet can we not insist very strongly on this point, as some of the preceding cases were certainly not very severe. The cases of Wegner, Waldeyer and Köbner, and Parrot were of the most malignant form, the superficial and visceral lesions extensive, and the osseous lesions of the most marked type; insomuch that it would seem very probable that the extent of distribution and severity of the latter lesions are materially influenced by the more or less malignant character of the disease which they manifest. The same remarks apply, of course, to every other variety of lesion. Diday,<sup>1</sup> when he wrote his book, seemed evidently surprised at the immunity of the osseous system in infantile syphilis, and alludes to the vital hyper-activity of this system at the earlier periods of life. We are now in possession of facts which show that this im-

<sup>1</sup> Op. cit.

munity does not exist, and have cogent reasons for believing that the morphological activity of the osseous system tends seriously to predispose it to syphilitic modification. Behind all these conditions, namely, of intensity of the virus and active morphological change, there is a point of very great interest to be remembered; it is, that in some individuals there are local tissue tendencies to abnormal cell-proliferation, and such may enter as a very serious modifying influence in the production of the bone-lesions. Such tendencies to hyperplasia are commonly seen in children, affecting all tissues and organs, a point of no little importance in forming our conclusions, prospective or retrospective, in cases of the sort. The condition just alluded to is generally spoken of as scrofula, but under whatever name it is considered, certainly must be conceded to exercise a powerful influence on the course of inflammations in children. I am inclined to think that this tendency existed in my eleventh case, in which separation of the epiphysis occurred; for the cutaneous lesions were of a very mild character, and the general condition of the infant did not indicate a profound cachexia. The scope and purpose of this treatise does not permit me to consider this subject more fully; so that I have to confine myself to a simple mention of it.

XXII.—THE CONDITION OF THE SYPHILIS OF THE MOTHERS IN  
WHOSE INFANTS OSSEOUS LESIONS ARE OBSERVED.

The question of the intensity of the syphilis in the child brings us to the consideration of one of the final points in the clinical history of these osseous lesions; what is the condition, as regards syphilis, of the progenitors of these children? Knowing, as we do, that the recent development and the severity of the syphilis of the mother tend to produce severe syphilis in the child, we might summarily pass over the etiology of these lesions by briefly saying that they were undoubtedly an expression of a severe form of syphilis in the parents. But I think that, as we have facts from which to draw conclusions, it is well to bring them out, and endeavor to establish their bearing in this matter. I shall not introduce the vexed question of the influence of the syphilitic father upon disease of the child, as it is still an unsettled point; one, besides, which has recently been very ably handled by my friend, Dr. F. R.

Sturgis,<sup>1</sup> and also been treated of at some length in France by Mireur,<sup>2</sup> and, quite exhaustively, in Christiania, by Oewre.<sup>3</sup> My remarks and conclusions will be based upon the history, as far as obtainable, of the syphilis of the mothers of the children whose cases I have detailed.

Of my twelve cases, the mothers of three of the children had been syphilitic fully two years; one of them was at the end of her first year of syphilis; three were infected at the fifth month, and two became syphilitic at conception. The case not included in this category is the one of acquired syphilis, and will be treated of separately.

Comparative analysis of these cases shows us very clearly that a recent infection and severe form of syphilis in the mother were attended by extensive and profound osseous lesions in the child; but we cannot also deduce the antithesis of this proposition that a quite distant infection and a mild form of the disease were attended with osseous lesions limited in extent and severity. The ninth and tenth cases show clearly the weight of the first assertion. The mothers became syphilitic at conception, and, although the disease was active, were not treated, while the children had extensive osseous lesions, complicated with severe degenerative changes. The three cases in which infection of the mothers occurred in the fifth month of pregnancy, show osseous lesions of a somewhat milder form. In one of these cases degenerative changes occurred, but they were not as severe as they were in those cases, nor were the lesions nearly as extensive. The mothers did not undergo treatment. In another of this second series the mother was negligently treated for about three months, and the lesions, though numerous, were of the resolute variety. The third of this group is the one most marked. The mother of this child gave evidences, during her pregnancy, of severe syphilitic lesions and profound cachexia, and I felt apprehensive that her child would be still-born. She followed quite regularly, under my instruction, an active treatment, and, though her child showed

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<sup>1</sup> On the Etiology of Hereditary Syphilis. New York Medical Journal, July, 1871, and July, 1873.

<sup>2</sup> Essai sur l'hérédité de la syphilis. Paris, 1867.

<sup>3</sup> In a series of three articles published in the Nordskt Medicinskt Arkiv, for the years 1871-72 and 73.



severe syphilitic manifestations, they were not as bad as I should have expected, and the osseous lesions were not as numerous as in the other cases, exhibiting no degenerative tendency. When all the symptoms of the mother of this child are compared with those of the mothers of the first group, it can be readily seen that we have every reason to think that, unless treatment had been followed, the osseous lesions would have been equally as profound as in the children of the first series.

The lesions of the children whose mothers had been syphilitic from one to two years, show no well-marked characteristics, except that perhaps they were rather more extensive than might have been expected to occur at the rather late period of the infection. They did not show degenerative tendency, but in some instances were quite as numerous as those resulting from recent infection. An important point here presents itself, and one which we must not lose sight of, namely, that the mothers were scarcely, if at all, treated, and we have every reason to believe that, if they had been, the children might have escaped with perhaps an almost uncontaminated organism. The eleventh case also belongs to this category, and is interesting in the fact that the child's syphilis was not manifestly very active, though born of a mother within the second year of her disease, which had not been properly treated. In this instance, I thought that there was an inherent tendency in the child to tissue degeneration. These cases show clearly that a remote period of infection of the mother does not give to her offspring a total immunity to the development of syphilitic lesions, including those of the bones. However, some of these cases are what may be called examples of remote contagion. We, to-day, recognize clearly the fact that, within a period of one year and a half or two years and a half after syphilitic contagion, there is engrafted upon the organism a tendency to the development of its peculiar hyperæmia and hyperplasia, which we speak of as syphilitic lesions. After this time, this tendency, we know, may gradually cease and even become extinct; yet are we unable to lay it down as a law, at what period this extinction occurs; consequently, as the tendency to the development of these lesions is transmissible, we cannot say when this transmissibility also ceases. We know that this peculiar proliferative action

is greater and more lasting in some persons than in others, but are unable to assign any reasons more exact of this variation than those herein already given. Some mothers, whose nutrition may not be affected by syphilis, may, and we see such cases very often, transmit children, who have a like immunity. As we have no other reliable records of cases, we must assume, judging from our present knowledge, that the tendency to the transmission of severe forms of syphilis with osseous lesions is confined to the early years of the disease in the mother, and that, as her tendency to hyperplasia and hyperæmia wanes, so will it gradually become less apparent in her offspring. As I have said before, we cannot lay down any rule, except, perhaps, that, after the fifth or sixth year of contagion, hereditary transmission of syphilis in the form of grave lesions ceases, or manifests itself but very feebly. The dates, as far as given by other observers, show that the contagion was quite recent in most of the cases, and in none of them very remote. This point is one of great importance, and one which will well repay accurate clinical observation and study in the future.

There is, in this matter of the transmission, one point which has been well brought out by one of my cases, and, in a negative manner, by nearly all the rest; I mean, the value of treatment. This cannot be too much insisted on in the cases of pregnant women as tending to insure a healthy organism in the fœtus. The development of the osseous lesions in the child four years and four months old, who was the subject of acquired syphilis, is an instance of the disturbance of normal nutrition by the syphilitic virus; but this lesion was simply a proliferative one, such as we see very frequently in the early stages of acquired syphilis; a mere thickening of the fibrous tissues of the joints and bones, and not proceeding from gummy infiltration, as manifested by external and other symptoms. This case and that of Roger, as has been said before, prove clearly that syphilis may induce the same developmental changes in the bones in its acquired as well as in its hereditary form. This peculiar condition of the system, in which predisposition to active abnormal cell-proliferation may exist in the mothers, and may then render their disease graver in character. The transmissibility of this condition with syphilis to the child, and the effect of the two upon its organism, are points in pathology of

very great import, worthy of attentive observation and reflection. It might also be desirable in such an investigation to consider the age of the mother, as we know that a very young organism is usually more severely affected by syphilis than a mature one. The fact of the youth of the mother rendering her syphilis more severe, makes it probable that the disease in her offspring would be equally so. This was suggested to me by my eleventh case, in which the mother received the contagion in her seventeenth year, in whose child was found a tendency to active cell-proliferation.

In order that a clearer view may be given of the comparative condition of the syphilis in the mothers and children of my cases, I will here, in parallel columns, oppose the main facts of each instance.

MOTHERS.

CHILDREN.

CASE 1. Mother two years syphilitic; rather mild form of disease. No treatment.	Lesions in infant extensive and symmetrical.
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CASE 2. Mother two years syphilitic; apparent waning or running out of the disease. Treated for short time.	Lesions in infant extensive and symmetrical.
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CASE 3. Mother infected at fifth month of pregnancy; treatment for three months; syphilis severe and not sufficiently modified by the mercury.	Lesions in infant extensive and symmetrical.
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CASE 4. Mother within second year of syphilis; no regular treatment; form of disease not especially severe.	Lesions in infant extensive; showed a tendency to develop in crops.
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CASE 5. Mother nearly a year syphilitic; disease not of grave form; treatment for three months.	Lesions in child were not extensive, but underwent degenerative changes. Infant's health not bad.
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CASE 6. Infection of mother at sixth month of pregnancy; rather severe form of disease; no treatment.	Lesions in child not extensive, but underwent degenerative change.
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CASE 7. Infection of mother Lesions in child not extensive at fifth month; severe form of disease; active and regular treatment. sive, nor symmetrically distributed; mild in type.

CASE 8. Acquired syphilis. Lesions may be classed as being moderately severe.

CASE 9. Mother infected at the beginning of pregnancy; disease rather severe; no efficient treatment. Lesions extensive and symmetrical, followed by degeneration.

CASE 10. Mother infected at the beginning of pregnancy; disease (not active) for two months. Lesions in child very extensive; underwent profound degeneration.

CASE 11. Mother syphilitic fifteen months; no treatment; disease rather mild of form; probable strumous tendency. Syphilis of the child not very severe; a limited number of bones affected; degeneration of osseous lesions probably induced by struma.

CASE 12. Syphilis of mother not active; no treatment. Lesions of child mild; limited number of bones affected.

(To be continued.)

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## A CASE OF PUERPERAL PERITONITIS COMPLICATED WITH ACUTE YELLOW ATROPHY OF THE LIVER, WITH REMARKS.

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(Presented to the N. Y. Obstetrical Society, Jan. 6th, 1874.)

THE patient whose history is here recorded was originally an inmate of the lying-in ward of one of our city hospitals.

An epidemic of puerperal fever having occurred in her ward with very fatal results, the patients not yet delivered were sent to other hospitals, in order to isolate them from the contagion. Her history on admission to the Presbyterian Hos-

pital (Ward No. I.), on Dec. 23d, 1872 (service of Dr. Edward C. Seguin, *Attending Physician*), was as follows :

Dora R., aged 27, born in Ireland, unmarried, dressmaker by occupation, supposes herself to be at the end of the eighth month of utero-gestation, but is uncertain as to the date of her expected accouchement. On examination by the House Surgeon she is found to be a well-nourished, strongly-built, vigorous brunette.

The mammary glands are large and tense; the areolæ are very dark and well marked.

The abdomen is enlarged, apparently, nearly to its usual size at full term.

The umbilicus is protuding considerably, and the respiration is thoracic mainly.

By percussion, an abdominal tumor is easily mapped out, extending to a hand's-breadth above the umbilicus, and considerable tympanites exists.

On auscultation, respiration is found to be somewhat puerile. Heart sounds normal.

The placental bruit is very distinct near the umbilicus.

No foetal heart is made out, perhaps on account of numerous borborygmi.

Vaginal examination finds the uterus very much enlarged and low down, the os is patulous, the cervix soft, and the index finger readily passes to the os internum.

The patient says she is very constipated, but that, in other respects, she is comfortable.

She is ordered house-diet, and laxatives, *pro re nata*.

Up to January 12th, 1873, the abdomen has been steadily increasing in size since her admission, and the foetal movements are very distinct, and, for several nights, the dyspnœa has been at times very distressing, and has prevented her from sleeping.

At this date, auscultation by the House Surgeon reveals the bruit as before; a foetal heart is now distinctly heard well down towards the left iliac fossa. Another foetal heart is heard, at the same examination, with its point of maximum distinctness at the level, and two inches to the right, of the umbilicus, and the diagnosis of a twin pregnancy is made.

*January 27th, 1873.*—The condition is little changed; she

has had slight pains, described as "cramps," in her back and lower limbs, which have lasted an hour or two; is constipated again; ordered ol. ricini, half a fluid ounce.

*January 28th, 10 A.M.*—Patient has sharp labor pains.

Digital exploration finds the cervix beginning to dilate; pains occur once in twenty minutes. Ordered to be carefully watched, and put in bed at once, as soon as the pains occur oftener than once in ten minutes, and the House Surgeon is to be notified promptly.

11 A.M.—The patient, having insisted on walking about for a few moments, is seized with a single violent pain while standing, and a full-grown male child is born, and falls to the floor; the umbilical cord being ruptured.

The House Surgeon, being in the building, is instantly called. The patient, who has fallen to the floor, is put in bed at once.

The child is found to be uninjured, the cord is shortened and tied, and a vaginal examination finds the membranes of a second foetus, presenting by the breech, at the superior strait.

11:15 A.M.—A violent pain again occurs; the membranes are ruptured, and the body of the second child is expelled. The head is detained for an instant, but soon passes the perinæum.

The infant is laboring under cerebral congestion, and the cord is allowed to bleed half a fluid ounce; which depletion, together with flagellation and cold affusion soon induces vigorous respiration.

The pains soon recurring, the placenta and membranes are extracted entire, and the uterine contractions prove prompt and permanent.

The binder is applied as usual, and perfect repose in a recumbent posture ordered.

The mother being comfortable, although somewhat nervous and excited, is given by hypodermic injection eight minims of Magendie's solution, and soon falls asleep, remaining free from pain all day.

*January 29th, 10 A.M.*—Has slept well all night, but is now complaining of sharp pains along the sciatic nerves. Is ordered friction over the seat of pain, with linimentum chloroformi.

4 P.M.—Is now relieved of her pain; is ordered vaginal douche of diluted liquor sodæ chlorinatæ twice a day.

*Complicated with Acute Yellow Atrophy of Liver.* 235

*January 30th*, 2 A.M.—Has a severe chill, which lasts twenty minutes.

10 A.M.—T.  $102^{\circ}.6$ ; P. 104, sharp, irritable; R. 24. Slight abdominal tenderness and tympanites; respiration thoracic.

Is ordered liquor morph. sulph., U. S. P., half a fluid drachm at the following hours, viz.: 11 A.M., 12 M., 1 P.M., and 2 P.M.; at 2 P.M., the vital signs are as at 10 A.M., and patient is somewhat narcotized.

4 P.M.—Is awake, but has no pain or tenderness. Slight tympanites still. T.  $104^{\circ}$ , P. 104, R. 24. Ordered turpentine stupes.

6 P.M.—Ordered 5 minims, Magend. Hypo.

11 P.M.—T.  $102^{\circ}.6$ , P. 100, R. 20. 5 minims Hypo.

*January 31st*, 10 A.M.—Feels more comfortable. T.  $99^{\circ}.6$ , P. 88, R. 20; sleeping almost all the time.

4 P.M.—T.  $99^{\circ}.6$ , P. 90, R. 22.

*February 1st*, 10 A.M.—T.  $99^{\circ}.4$ , P. 88, R. 24. Feels comfortable; her appetite is good, and the children are doing well.

4 P.M.—T.  $100^{\circ}$ , P. 100, R. 25. General symptoms are abated; ordered morphia hypodermically, to keep her perfectly comfortable and free from pain.

*February 2d*, 10 A.M.—T.  $100^{\circ}$ , P. 100, R. 25. Patient is much worse, her tongue is heavily coated, her stomach is very irritable, and since she was last seen has developed very marked jaundice, especially in her face. Urine is high colored, and high specific gravity, no albumen or casts.

4 P.M.—Stomach is less irritable; ordered dilute nitro-muriatic acid, 16 minims every 4 hours. T.  $101^{\circ}$ , P. 100, R. 25.

*February 3d*, 10 A.M.—T.  $103^{\circ}.8$ , P. 120, R. 45. Diarrhœa commenced to-day with increasing tenderness over the abdomen. Excreta greenish yellow; acid stopped. High fever. Ordered sulph. quiniæ, grs. 6; opium, gr. 1. To be taken at once. Camphor stupes over abdomen. Lochia are now stopping. The vaginal douche is changed to a 2 per cent. solution of carbolic acid three times a day. Ordered quin. sulph. grs. 5, every three hours.

5 P.M.—Patient is much more comfortable. T.  $100^{\circ}$ , P. 100, R. 30.

*February 4th*, 10 A.M.—Slept comfortably during the night; T.  $100^{\circ}$ , P. 100, R. 25, the diarrhœa is much less to day; or-

dered 10 minims tinct. opii, in starch water a fluid ounce, per rectum, after each stool.

5 P.M.—T.  $104^{\circ}.3$ , P. 132, R. 40. Patient is now vomiting violently, but becomes more quiet after a few minutes. The jaundice is now very marked.

*February 5th*, 10 A.M.—T.  $101^{\circ}$ , P. 120, R. 32. Quinine continued every three hours as before. Morphia p. r. n. A very rapid emaciation of the body is now first noticed, and the patient complains of pain in the right hypochondrium and right infra-axillary regions, but repeated physical explorations reveal absolutely nothing.

The liver dulness is nearly or quite normal in its boundaries; if any variation occurs, the area is increased rather than diminished.

The milk has been diminishing for forty-eight hours, and is now entirely suppressed.

5 P.M.—T.  $100^{\circ}.6$ , P. 110, R. 30. Stomach again very irritable; jaundice is now marked. Diarrhœa still continues. Ordered carbonic-acid water and ice ad libitum, and diluted hydrocyanic acid pro re nata.

*February 6th*.—General condition as yesterday, except that she now has pain in the *left* hypochondrium. Renewed exploration again reveals nothing. Temperature, during the day, varies from  $100^{\circ}$  to  $101^{\circ}.5$ ; P. 130; R. 40; tongue brown and dry.

*February 7th*.—Her condition is unchanged, except that she is growing weaker. Vital signs as yesterday.

*February 8th*.—Less diarrhœa to-day; has now become extremely emaciated. The jaundice has now reached a maximum, and the patient is as yellow as saffron. Her mind is now somewhat affected, as she was slightly delirious during the night.

10 A.M.—T.  $102^{\circ}$ , P. 116, R. 37. 5 P.M.—T.  $101^{\circ}.6$ , P. 136, R. 40. This afternoon, large and small ecchymotic spots in great numbers begin to appear on the posterior aspect of the trunk and thighs.

*February 9th*, 10 P.M.—T.  $102^{\circ}$ , P. 130, R. 40. Is very much worse, and constantly delirious, and her stomach rejects everything.

4 P.M.—T.  $102^{\circ}.2$ , P. 136, R. 45. Although the area of



*Liver* dulness is not diminished, the diagnosis of acute yellow atrophy of the liver is decided upon. The patient is evidently dying.

11 p. m.—House Surgeon is called by the night nurse, and finds the patient unconscious and with cold extremities. T. in axilla,  $100^{\circ}$ ; P. 152, fluttering; R. 50.

12:30 p. m.—Patient dies quietly.

Autopsy, February 11th, 10:30 a.m., thirty-four hours after death:

*Rigor mortis* fairly marked.

Very extensive ecchymoses on the posterior aspect of trunk and thighs, as well as along the course of the veins in the hypochondria and epigastrium.

General icterus of entire surface, especially marked in face.

*Brain*.—46 ounces.

*Dura Mater*.—Adherent in front near the longitudinal sinus, and its inner surface is stained with bile pigment.

Slight punctate ecchymoses are seen over the left vertex. The convexity, base of brain, and major section present nothing abnormal. The vessels appear permeable.

Right lateral sinus is empty, but the left contains a recent clot.

The longitudinal sinus contains a series of small recent clots, whitish, firm, elastic, and not filling the calibre of the sinus.

A few small ecchymoses are seen on the basal dura mater.

*Heart*.—Twelve ounces. Four fluid ounces of serum are found in the pericardium. A large deposit of fat is on the right ventricle. A well-organized clot is in the left ventricle.

The right side of heart and aorta are normal. A firm and large clot in left auricle.

*Lungs*.—Right, twenty-four ounces. Is adherent to pleura all over inner side. The upper lobe is markedly pigmented in spots, extending clear through the lobe, together with œdema, well marked.

*Left Lung*.—Sixteen ounces. Adherent at apex, and very dark in color. The lower part of the upper lobe is emphysematous. The pulmonary pleuræ on both sides stained yellow.

*Abdomen.*—The parietal peritonæum is markedly injected, and is the seat of minute and numerous extravasations.

*Stomach.*—Is extremely injected, especially at lesser curvature.

*Spleen.*—Five ounces. Small and soft.

*Liver.*—Sixty-six ounces. Extends from the upper border of seventh rib to the lower border of the fourth rib. Left lobe adheres to the diaphragm, all over its upper and posterior surface, and is elongated to the left and upwards. The surface of the organ shows stellate ecchymoses. Its substance is soft, yellow, and breaks down at a touch. The gall bladder is empty.

*Microscopic examination.*—(Hartnaek's No. 10 immersion, with No. 1 ocular.)

Scrapings from left lobe show only two or three hepatic cells to the field, and these are filled with a fatty, granular matter. The rest of the field shows fat granules, drops and debris. Certain parts of right lobe show the normal number of cells, which have indistinct nuclei, and contain abnormal amount of fat. Elsewhere, conditions are the same as in the left lobe.

*Pancreas.*—External surface is covered with extravasations.

*Intestines.*—Are in parts much injected; the mucous membrane of small intestines is very soft, and easily removed by slight scraping.

*Right Kidney.*—On its posterior surface a large hemorrhage. Its upper end shows a transverse cicatrix in the capsule; ecchymoses are in the cortex chiefly, and are remarkably punctate in appearance, decidedly best marked close to bases of pyramids, and at lower end.

*Left Kidney.*—A small cyst is on the posterior surface, and ecchymoses are found on both surfaces. The cortex is very yellow with slight ecchymoses.

*Pelvic Cavity.*—The fundus uteri and adjoining coils of small intestines are covered with pus. The pelvic cavity contains a large amount of purulent fluid. The left broad ligament is the seat of a cyst, about one inch in diameter. A circumscribed abscess, containing a fluid ounce of pus, is found in the right broad ligament, low down.

No pus whatever is found in the uterine sinuses. Uterine section shows nothing abnormal.

Examination of the kidneys, in sections transverse to the axis of a pyramid, shows the epithelium of the tubuli uriniferi with fat cells enclosed, with nuclei indistinct and numerous small masses of pigment scattered about. Repeated examinations of the urine for tyrosin and leucin gave no decisive results.

Our knowledge of the disease known as acute yellow atrophy of the liver is essentially modern, Morgagni being the first to confirm his diagnoses by accurate autopsies, while the older reported cases generally seem to be wanting in careful post-mortem proof.

Among these are a number of interesting accounts, such, for instance, as the case mentioned by Vercelloni, where, after sudden severe fright, a young man was seized with intense jaundice, followed by delirium, a rapid and irregular pulse, great dyspnoea, and death on the third day.

Rubens reports in 1660 a similar case, where death occurred on the fifth day.

Baillon mentions a young man, aged fourteen, who, after a slight attack of jaundice, became delirious, and died in convulsions on the fifteenth day. The autopsy revealed no cerebral lesions, but a small yellow liver.

Bonet speaks of Cardinal Sforza, who died on the sixteenth day of a jaundice, during the last three days of which cerebral symptoms were prominent. An autopsy found a yellow liver.

Morgagni refers to several of these cases, and adds two others by Valsalva, in which, apparently as the result of mental emotion, two young men died, one on the first, the other on the second day, of a severe jaundice.

These cases appear to have attracted little notice till the labors of Rokitansky, Horaczek, and Budd, since which time reported cases have been much more frequent, although far from numerous. In the study of this remarkable disease, we have no marked analogies to guide us, no pathological change in the circulation of the liver sufficient to explain the sudden and fatal result. Let us first glance at the pathology.

Liver much diminished in size. Frerichs reports one of twenty-nine ounces; Bright, another of nineteen ounces.

Its thickness is often less than an inch; it is flattened from above downwards, and its anterior edge is thin and sharp.

The capsule is puckered, but presents no marks of exudation. It is spotted by ecchymoses and sub-peritoneal extravasations.

Liver tissue is soft, flabby, easily broken down, even pulpy in some cases. Its section is orange-red or rhubarb color. The microscope shows that the divisions between the acini have disappeared, and that the cell-structure is broken down, and in parts entirely destroyed.

The cells still remaining are fatty and granular.

In the early stages, when the changes are less advanced, we find a dirty gray exudative material between the lobules, which are surrounded by congested vessels.

The end of the process in the liver is thus seen to be a complete destruction of the secreting structure.

The gall-bladder is usually empty, the spleen is enlarged, and ecchymoses are frequent, especially in the peritonæum and the gastric and intestinal mucous membranes.

Kidney epithelium is pigmented, fatty and granular.

The blood and urine contain, usually, leucin and tyrosin.

We are now prepared to consider the symptoms.

The disease is ushered in by loss of appetite, sense of pressure and fulness in the epigastrium, and other symptoms that remind us of gastro-intestinal catarrh. In most cases, "a moderate jaundice would excite the suspicion that the ductus choledochus is being invaded by the catarrh, but nothing betrays the imminent danger overhanging the patient." Soon the jaundice increases, with tenderness over the liver, and the patient complains of severe headache, which ushers in the cerebral symptoms. After a stage of restlessness and delirium, the patient falls into a stupor, sometimes preceded by convulsions; then becomes comatose, with dilated or normal pupils, sighing, and, at length, stertorous respiration. To arrive at this stage requires from twelve hours to five days, but seldom more than a week. The pulse, slow at first, rises with the cerebral symptoms to 110 or 120, with, however, remarkable variation both in frequency and force, although an extreme degree of feebleness in its beat is a constant premonition of the rapid approach of death. As this draws near, the patient passes into sudden collapse, without rousing from his coma. The rapid pulse becomes very weak, and the patient usually dies on the second day—more rarely the fourth or later. Sordes very early appear on the

tongue and gums, and control over the sphincters is soon lost.

The abdomen is generally tender, especially the right hypochondrium, where pressure, even in deep coma, will cause the patient to wince. The bowels are usually constipated, but occasionally the reverse takes place.

As the jaundice increases, extravasations of blood occur under the skin, with hemorrhage from the nose, vagina, stomach, rectum, and bronchi.

The urine is brown from bile pigment, and contains generally tyrosine, leucin, and occasionally albumen.

In regard to the duration of the disease we noticed that in thirty-one cases reported by Frerich, in three cases the day of the disease on which death occurred was not known; thirteen died in the first week; six during the second; five during the third; four during the fourth week.

The causation of the pathological change seems very obscure.

According to Rokitsansky, it is an infiltration of the organ by bile, and consequent liquefaction of the hepatic cells.

This position appears untenable since, even if the biliary elements *could* appear in large amount in the blood of the portal veins, as Rokitsansky supposes, Frerichs has shown, by direct experiment, that hepatic cells give no signs of solution when immersed in bile for days.

According to Hensch, it is polycholia, causing compression of the capillaries by the distended excretory ducts, and consequent fatty degeneration of the cells from mal-nutrition.

Von Dusch considers it a sort of paralysis of the bile ducts, with biliary infiltration of the organ, and consequent dissolution of the cells. The views of the last-named observers are probably incorrect, for we know that, in cases of obstruction of the ductus choledochus, the liver may be distended with bile for months where no atrophy occurs.

Buhl considers it, reasoning from the brain symptoms, as somewhat analogous to typhus; while Bright, Engel, Wedl, Banberger, and Frerichs consider it a form of diffuse or parenchymatous inflammation—that is, an inflammation where no free exudation occurs in the interspaces between the tissue elements, but where the elements themselves swell up by absorbing an albuminous material, and ultimately undergo a combined

granular and fatty degeneration. The cerebral symptoms are difficult of explanation, although among the most prominent.

The hemorrhages are apparently the result of interference with the nutrition of the capillary walls, as is also seen in many other diseases that affect the composition of the blood. As regards the inflammatory theory of this disease, the most we can say is, that the course of inflammation in other organs is entirely different, and that in no other organ does a parenchymatous inflammation occur, in which sudden and extreme atrophy of the organ is combined with such entire destruction of the tissue elements.

In the causation of this disease, mental emotions, especially severe fright or anger, a dissolute life generally, especially venereal excess, and syphilis, abuse of mercurials, typhus and allied blood poisons, have been mentioned. The frequent coincidence of malignant malarious disease has been remarked by Budd, Griffin, and other observers.

Sex bears an important relation to this disease, for out of 31 cases 9 were men, 22 women, and of the women one-half were pregnant or puerperal. As regards age, it occurs very rarely in children. In 66 per cent. of all cases, the patients were 20 to 30 years old; in 20 per cent. 10 to 20 years of age; in 10 per cent. 30 to 40 years; the remaining cases being from 40 to 60 years old.

This disease is very rare, for Spaeth, out of 33,000 pregnant women, found only two cases, and Murchison met only one case out of 15,000 patients at the London Fever Hospital.

The chief elements in the diagnosis of this very fatal disease are:

First, the characteristic brain symptoms, with the marked hemorrhagic diathesis.

Second, the rapid diminution, and even total extinction of liver dulness and a corresponding increase in the boundaries of the spleen.

Third, the abnormal presence of tyrosine and leucin in the urine.

The prognosis is very grave. It is doubtful if any have ever recovered.

With the rapidly fatal termination, therapeutics becomes em-

pirical and almost useless. The English school regard brisk purgation with drastics with some favor.

Quinine and the mineral acids, with ice pills and cold douche to the head, have had their advocates, but treatment must evidently be for symptoms mainly.

The patient whose history is herewith detailed has been a source of much interest to us, not only as presenting this rare disease in its typical associations with the puerperal state, but as being also one of the very few cases of that disease in which the term atrophy is a misnomer, as the liver was rather *above* the usual weight, the spleen somewhat *under*—quite the converse of the usual very characteristic post-mortem appearances.

The causation in this case is also confessedly difficult of explanation. None of the causes which we have enumerated would seem to be efficient, as her health was almost perfect prior to her accouchement.

Still, if we take into consideration that nearly 40 per cent. of all reported cases are pregnant women, and recognize the influence of pregnancy upon the circulation of the abdominal viscera, we may be able to clear away some of the difficulties which might otherwise embarrass us.

It seems now generally admitted that in pregnancy the kidneys often become the seat of parenchymatous infiltration to such an extent as to end in fatty degeneration of the epithelium, and that the same pathological lesion *may* occur in the liver. Should the changes advance to diffuse nephritis or hepatitis, in the one case we shall have fatty degeneration of the kidney, and in the other atrophy of the liver.

Seanzoni thinks this result may occur from mechanical compression, by the enlarging uterus, but the disease generally appears early in pregnancy before the uterus is very large, and when thus occurring fatty kidney has been almost invariably observed.

The main difficulty of diagnosis in the present case was plainly the *large* liver and *small* spleen, and the negative results of urinary analysis.

The autopsy abundantly sustains the diagnosis of the attending physician, Dr. Seguin.

When reported to the Pathological Society it was, we believe, the fourth reported case where no diminution of the liver took place.

Especial thanks are due to Dr. E. C. Seguin for his kindness

in permitting publication of the case, and to Prof. Alfred L. Loomis for valuable assistance in consulting authorities.

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### DILATATION OF THE CERVIX UTERI, PARTICULARLY THE ORIFICIUM EXTERNUM, BY MEANS OF A NEW INSTRUMENT.

By J. R. VANDERVEER, M.D., Brooklyn.

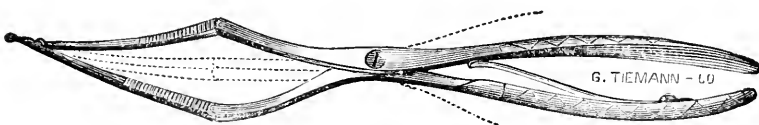
So much has been said and written of the dilatation of the cervix uteri, that it seems almost presumptuous to add to the literature of the subject. I therefore beg the indulgence of offering a few very brief remarks on extensive *bilateral* dilatation of the os externum together with probing and slighter dilatation of the os internum, and the advantages derived from the use of a new instrument, constructed for me by Tiemann & Co., of New York.

For some years past, I have largely experimented in widening



the cervical canal of the uterus, both for the relief of obstructive dysmenorrhœa and for the removal of the sterile condition, and in so doing I have used instruments each of service in its own way, but in every instrument made use of or examined the stress of dilatation was expended on the os internum, the middle of the cervix, or the whole of the cervical canal equally.

It was found that in *some* of the cases treated very little expansion of the os internum was called for; in a *few*, that probing and the subsequent use of the uterine sound was all that was required; but in *many*, the most obstinate resistance to *permanent* widening was encountered at the os tinca, and the dense tissue adjacent: and the question was presented, Could there be *any* substitute for cutting, or the more recently practised method of forcible and rapid dilatation (in one operation) and the subsequent use of the stem pessary? In solution of the query, a series of trials resulted in the planning of the instrument herewith represented, which has thus far, in my hands, answered every requirement made upon it. I have had as yet no occasion to expand the os externum largely and forcibly by one single introduction of the instrument, but it could be used for such a purpose, should circumstances require it.



The dotted lines show the instrument closed.

This instrument, it will be observed, dilates the os externum and cavity of the cervical canal *bilaterally*, and by its *probing* action keeps open the os internum. It will be noted, also, that its shape when closed approximates, and its diameter at its distal end does not exceed that of Simpson's sound; and also, that when in use the strain is expended on its strongest part: and that it can be used without the speculum.

But by no means the least important of the advantages of the instrument is, I think, its comparative safety, owing to its small size when closed, and to the fact of its not seriously lacerating the os internum when open, and from the circumstance, that

too severe tension upon any part under dilatation can be abated instantly.

Its use can be, of course, supplemented by stem pessaries and like appliances, or by what I have found answering the purpose very well, viz., a long laminaria tent with a shorter one introduced at each side, the whole kept in position by a suitable tampon of cotton-wool, with or without glycerine.

Briefly, in conclusion, this dilator is not offered as suitable to *replace* all instruments for widening the cervix uteri, but as a reinforcement, so to speak, to them, and to keep up permanent dilatation of the os externum, even after the use of the knife. I consider its *bilateral* action of great service likewise, as I believe the *transverse linear* os (externum) to be the normal one, even in the virgin, and the lengthened cervix with minute circular outlet (not extremely rare) to be most decidedly abnormal and analogous in some of its physiological conditions to phimosis in the male.

## ON PROLAPSE OF THE UMBILICAL CORD, ITS CAUSE AND TREATMENT.

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(Concluded from page 568, Vol. vi.)

### G. TREATMENT.

THE number of our cases is large, they are unusually successful, and I here propose to give the methods by which these favorable results have been achieved; to the discussion of these methods I shall confine myself, avoiding theoretical speculations on treatment, which may be found elsewhere.

I. *Methods of Treatment in General.*—There are cases of prolapse in which it is not desirable to leave the progress of labor wholly to the powers of nature, cases in which interference is necessary, yet no indications for operation exist: here the

first and most simple assistance we can render is by properly directing the patient's voluntary efforts; either, as the state of the case demands, to keep her quietly in one position, refraining from pressure with the abdominal muscles, or, when labor is far advanced, to encourage her to aid the passage of the head by the exertion of all her energies.

1. *Postural Treatment*.—Equally simple, and on that account probably neglected in clinical teaching, as well as in the text-books, is the Treatment by Position, which is a valuable aid to the practitioner in conducting any case of labor, and the obstetrician who carefully follows the progress of his case can often, by this more elegant and delicate method, guide to a safe and natural termination a labor in which instrumental interference would otherwise have been unavoidable.

By directing the patient to assume an appropriate position, and to carefully manage her voluntary efforts, we may, if circumstances are favorable, save the child without reposition of the cord or any manual interference.

By an appropriate position I mean the placing of the patient upon the side opposite to that in which the funis has prolapsed, so that the cord may be relieved from pressure, at least to such an extent as the influence of gravity in child and womb will permit, and may perhaps be so far released that, slippery and yielding as it is, it may glide back into the cavity of the womb.

Thus when the prolapse takes place in one or the other of the sacro-iliac fossæ, which is most commonly the case, as we have seen, we would naturally seek to throw the weight of the child forward upon the abdominal parietes, and this we accomplish by placing the patient on her hands and knees, in the knee-elbow position. I have achieved good results by this method, but the position is unfortunately very tiresome, and difficult to retain for any length of time, moreover cannot always be resorted to in private practice. In case we cannot make use of the knee-elbow position, or that it has proved too fatiguing, the patient must be placed in the corresponding side position, on the left side if the cord has prolapsed in the right sacro-iliac fossa.

In some cases of prolapse we may succeed with this treatment alone, but we most frequently have recourse to it as a preliminary measure, and as such it is our main, I may say our

only resort in the early stage of labor to relieve the cord from pressure, to preserve it well pulsating until the os is sufficiently dilated to undertake delivery.

Thomas, in a paper in the *New York Journal of Medicine*, as early as 1858, warmly advocates postural treatment in cases of prolapse; great credit is due our eminent countryman, who was one of the first to have called attention to this method, and it would have been well had his teachings been more carefully followed.

By postural treatment he, however, understands exclusively the knee-elbow position, which is an undue restriction of the term; his conclusions, too sweeping in some instances, were based upon only two successful cases, and were very properly modified in a later paper in which he says that "position alone will rarely, if ever, cause the return of the cord without the aid of manipulation, unless the bag of water is unbroken, and even then it may not."

This is a very just delineation of the value of postural treatment, which is not so much a method of treatment in itself as an adjuvant necessary in the majority of cases—sometimes, indeed, our only resort.

3. *Reposition of the Cord*.—Reposition of the cord, the carrying back of the prolapsed loop into the cavity of the womb beyond the presenting part, is a treatment which has been given up as ineffective by some and is most warmly recommended by others.

In our cases the results achieved by this method are not the most favorable; reposition was accomplished in only 7 of the 11 cases in which it was attempted in the Lying-in House, and though apparently successful in these 7 cases, the cord not reappearing, only 4 of the children were saved. In the out-door department the result gained by this treatment was but little better; reposition of the prolapsed loop having been practised in 32 cases, and, notwithstanding that the operation seemed to have succeeded in 26 of these, not more than 16 of the children were saved—in fact, by reposition of the cord alone only 13, as delivery was hastened by operation in the 3 other cases.

The life of the child was saved in 50 per cent. of the cases in which reposition was apparently successful, and in 40 per cent. of all the cases in which it was attempted; bearing in mind

that this treatment was only resorted to in the more favorable cases, with well-pulsating cord and normal pelvis, we must acknowledge that the results achieved were not such as to encourage us in giving it a more liberal trial.

Reposition has been freely resorted to in the cases here treated wherever it seemed indicated; it has perhaps been even too frequently tried because recommended by eminent obstetricians, and I must add by such, whose average results in cases of prolapsus funiculi are less favorable than those here achieved, but who, basing upon a small number of probably picked cases, have sought to prove reposition a most successful method of treatment.

Thus Michaelis, in his main series of prolapse cases, saves but 26 per cent. of the children, and in his treatise on the reposition of the cord (*Die Ursache des Vorfalles der Nabelschnur, und die Reposition derselben*) cites 11 cases of prolapse, in 9 of which he practised reposition with success; how is this to be explained? why was not this method equally successful in a larger number of cases?

Reposition is justifiable in many cases; in some it is preferable to any other mode of treatment; it has its strictly defined indications which I acknowledge and uphold, but at the same time I wish to see it restricted within these well-marked bounds, and not too freely resorted to.

Should the cord have prolapsed and the labor still be in such a stage that delivery is out of the question, reposition will under certain circumstances be in place, but more frequently we must resort to postural treatment and to a strict control of the patient's voluntary efforts.

Reposition of the cord must, with very few exceptions, be confined to cases of prolapse with head presentation; only when the rounded and resistant head presents can we expect a successful reposition of the prolapsed loop, so that after the loop has been carried back into the womb, beyond the greatest circumference of the head, the uterus can adapt itself closely to the advancing foetal part, and by its firm contraction prevent the immediate return of the prolapse, and guide the head into the most favorable position. Often, when reposition has apparently been effected, the cord again descends as soon as the hand is removed; in such cases the efforts at repo-

sition must not be too persistently continued, even if it be with the hand alone, which I consider preferable to any of the various instruments recommended.

Not unfrequently a life is lost by too obstinate perseverance in this one method of treatment, as the cord is endangered during a forced reposition by compression and traction, so that when the obstetrician has finally accomplished his object with considerable labor, the cord he has replaced is pulseless; this is an accident which should not be permitted to occur. In other cases in which reposition appears to have been successful, a small loop, high in the brim of the pelvis, still remains exposed to pressure, and the operator who, deeming his object accomplished, permits labor quietly to progress, will be surprised to find the child born dead, notwithstanding all his endeavors. We see with what care the reposition of the prolapsed cord must be attempted, and when presenting still greater circumspection is necessary in the treatment.

Hueter (*Ueber Reposition der Vorliegenden Nabelschnur bei unverletzten Eihäuten. Zeitschr. für Geburtsh. vi. p. 222, 1831*), who wishes to have reposition performed while the membranes are still intact, describes one successful case of this kind, and gives this method the preference over that of reposition after rupture of the membranes, after prolapse has actually occurred. As the time most favorable for his operation he describes that period of labor when the os has attained the size of a silver half-dollar or dollar, and when the membranes are still lax in the interval between the pains.

The chances for the success of the operation are certainly much smaller than those for a rupture of the membranes in the attempt; and the escape of the waters at this period of labor, with presentation of the cord with the head, is an occurrence so dangerous to the life of the child that I must rule out this doubtful and hazardous method.

The reposition of a presenting cord should only be undertaken when the os is so far dilated that the escape of the waters is no longer to be feared, that, in case of necessity, delivery by forceps or turning can be immediately resorted to; in other words, this operation is superfluous; it is only to be attempted at a period of labor when there is no longer any danger from a rupture of the membranes, and delivery is possible and of

course preferable. If the presentation of the cord is discovered at an early stage of labor we must endeavor to force its return by a favorable posture of the patient, and the gradually increasing contraction of the circular fibres in the lower segment of the womb; in addition to this the presenting loop may be gently pushed upward while the head is being pressed down into the pelvis; the parts all being rounded, smooth, and slippery, the cord glides upward into the more spacious cavity of the womb as it is forced aside by the slowly descending head; postural treatment alone may sometimes suffice to accomplish the result.

Michaelis gives the following very excellent description of the condition of things in this early stage of labor: "In the commencement of labor the contractions of the lower segment of the womb force the os toward the presenting foetal part. Tensely and closely it draws around this, and, if there be no abnormality, the presenting loop yields to the increasing pressure from beneath; slowly receding, it glides upward away from the os." Under unfavorable circumstances, in footling cases or abnormal position of the head (deformed pelvis), or if no part presents, the cord must retain its dangerous position. As labor progresses the os begins to dilate, and the labia, as the most tense part of the cervix, most firmly encircle the presenting part; the more regular and round the foetal part, the closer do they affix themselves to it.

This presenting part must of course be the head in order to secure perfect adaptation; it must be in normal position and sufficiently far down in the pelvis—conditions not easily fulfilled in a contracted pelvis.

We therefore see that the reposition of the cord should not be attempted; that it would be useless and even dangerous in any case other than a vertex presentation with the head descending in the canal of a pelvis which must deviate but little from the normal dimensions. If the pelvis be any way contracted, deformed, the uterus cannot so readily adapt itself so closely to the descending head, the cavity having lost that symmetry of form to which all the parts have been moulded, and little or nothing is to be accomplished by the introduction of sponge or colpeurynter, by which some would simply close the space made by the irregularities of the pelvis, in which the

cord threatens to descend. In transverse and shoulder presentations reposition is, as a rule, not to be undertaken; it is justifiable only if the funis descend in a region where it is more than usually endangered, for instance, behind the symphysis pubis; such cases, however, are rare; in the above as well as in vertex presentations we generally find the prolapsed loop in one of the sacro-iliac fossæ, where it may be preserved intact by the proper postural treatment until delivery by turning can be accomplished.

Reposition is by no means to be resorted to as the first attempt at treatment in a case of prolapsus funis, as has been vaguely recommended by some authorities; we must be guided in our treatment by the circumstances of the case, the stage of labor, condition of the pelvis and the uterus, by the position which the presenting part occupies, and the cause which had brought about the prolapse; if a deformed pelvis, no time need be lost in futile attempts to return the prolapsed loop; if laxness of the tissues, a womb enfeebled by frequent pregnancy, the cord may be returned without difficulty, the head forced downward well upon the os by external manipulation and there retained until the uterus, stimulated to action by the irritation of the operation and friction of the fundus, contracts more firmly, and the recurrence of the prolapse is no longer to be dreaded; as soon as the os is sufficiently dilated we should, however, resort to the more rapid and safe method of turning.

The operation itself is sufficiently simple. The obstetrician introduces that hand which corresponds to the side of the patient in which the cord has prolapsed, well into the vagina, and with two or three fingers carries the loop above the largest circumference of the head; with the other hand, manipulating externally, he presses the head down upon the os and retains both in place during at least one pain, taking care to force the head firmly down from without, while removing the hand from the vagina, and to continue the external pressure until the head has been so firmly grasped by the lower segment of the uterus that a return of the prolapse becomes impossible.

The various instruments devised to aid in reposition are well known; the simplest and best adapted to the purpose is the catheter, with mandrin, which in Germany is known as Braun's repositorium, in England as Robertson's funis replacer;



yet this should only be resorted to in case of a very small and rigid, or retracted os, as the hand will generally be found more serviceable. Reposition accomplished, the foetal heart must be closely observed; auscultation must guide the obstetrician in those anxious moments in which the success or failure of the operation becomes apparent.

It is by auscultation alone, when the pulsation of the foetal heart grows weaker and more faint, that we can diagnose those treacherous cases where reposition seems to have been accomplished, yet a small loop remains compressed high in the pelvis, where it cannot be detected by the examining finger, and where speedy delivery is the only hope, if practicable, and if not, where postural treatment, our first and last resort, must be attempted.

If the foetal pulse again becomes strong and regular, continuing so after several pains, we may be assured of success.

3. *Anæsthesia*.—The use of chloroform was frequently resorted to, and proved a valuable adjuvant in achieving reposition of the cord.

All more serious operations were, whenever at all practicable, performed under the influence of chloroform, and it is to a great extent to the careful and consistent use of this anæsthetic that I ascribe the successful results obtained. Chloroform not only renders the operation painless, but above all, causes complete relaxation of the muscular fibres, voluntary as well as involuntary, and this is the important point. The patient well under the influence of the anæsthetic, the uterus and abdominal muscles are at rest and yielding; the womb no longer offers that intense resistance to the introduction of the hand; the manipulation of hand or instrument in its cavity no longer causes irritation and reflex action, and the conditions are thus by far more favorable for a rapid and successful operation.

In such cases only where pulsation of the cord had almost ceased and speedy delivery was necessitated, was version performed, or the forceps applied, without the use of chloroform. I have spoken of chloroform throughout, upholding the necessity and the advantages accruing from the use of an anæsthetic, without reference to the bitter strife now waging between the

partisans of ether and of chloroform, which has remained comparatively remote from the field of obstetric operations.

I myself give preference to chloroform, as in labor cases it is equally harmless with ether, and less liable to produce nausea.

4. *Forceps*.—The forceps was not used as freely as we might expect; its application, as a means of saving the child, was resorted to about as often as the reposition of the cord. In 15 of the 30 cases in which it was applied, the child was saved, which is about the same result as that achieved by reposition of the cord, if we deduct those cases in which manual or instrumental delivery was resorted to after reposition had been made or attempted.

Among our Lying-in House cases we find only two instances in which the forceps was used; both in a contracted pelyis, and both unsuccessfully. In one of these cases version had first been performed, but extraction by the feet being impossible, the forceps was used; and this is the only instance we have of its application to the after-coming head, its use having been restricted to head presentations and to such mal-positions as were reduced to normal vertex presentation during the progress of labor, either spontaneously or by external manipulation.

5. *Extraction by the Feet*.—Extraction by the feet simply (not following version) was practised in 65 cases, in 47 of which, 72.3 per cent., a living child was developed. The success of this operation naturally depends upon the favorable prognosis offered by breech-first labors, in which alone it can be resorted to.

The treatment in foot and breech presentations, as in all other cases, if presentation of the cord has been detected, is mainly a postural treatment, the patient being so placed that a return of the presenting loop may be facilitated; all muscular strain must be avoided, the membranes must, if at all possible, be preserved intact until the os is sufficiently dilated; when this is the case, the parts being yielding, we must not wait for threatening signs on the part of the foetal pulse, but at once deliver.

Extraction by the feet was practised in 14 of the Lying-in House cases, and in only one was the child delivered dead, putrid; a case which should justly be excluded. We see that here the success of the operation is perfect, as might well be

expected; less favorable are the results among the out-door cases, where the accoucheur, not unfrequently being called in too late, was often forced to extract an already lifeless child, the indication for the operation existing on the part of the mother.

6. *Version*.—The operation which was most frequently resorted to, which proved, comparatively speaking, most successful, is turning by the feet, immediately followed by extraction.

Of the 125 cases so operated, 72 were favorable, 57.6 per cent. of the children were saved, and this result holds good not only for transverse and shoulder presentations, but also for head presentations; with regard to the latter I shall make especial mention of the operation when we come to discuss more at length the treatment of head presentations complicated with prolapse of the cord.

In transverse and shoulder presentations, turning, and, if the prolapse has already taken place, turning by the feet, is the treatment naturally followed; yet when the cord presents, or has prolapsed in the early stages of labor, the same rules must be adhered to in these as in all other presentations: if the os is but beginning to dilate, and the cord threatened with compression, a change in the position of the prolapsed loop, an attempt at reposition, and postural treatment are called for; as soon as the hand can be readily introduced we must turn and extract if possible, with the assistance of full surgical anæsthesia.

TABLE VIII.—TREATMENT.

Method of Treatment.	Lying-in House.			Out-door Cases.			Total.		
	Number Operated.	Saved.	†	Number Operated.	Saved.	†	Number Operated.	Saved.	†
Turning, followed by Extraction....	16	8	8	109	64	45	125	72	53
Extraction by the feet.....	14	13	1	51	34	17	65	47	18
Forceps.....	2	0	2	28	15	13	30	15	15
Reposition of cord.....	7	4	3	26	16	10	33	20	13
Operations for saving the child....	39	25	14	212	129	83	251	154	97
Perforation followed by Cephalotripsy.....	10	....	10	15	....	15	25	....	25
Spontaneous, with postural treatment.....	14	6	8	2			14	6	8

7. *Cephalotripsy*.—Craniotomy can certainly not be classed among the operations called for by prolapse of the funis, yet I

cannot avoid making mention of this operation, as it was so often necessitated for the preservation of the mother, and as the large number of these operations, 25 among 365 deliveries, complicated with prolapse of the cord, most forcibly proves the frequency of the highly contracted and the distorted pelvis as cause of the prolapse. In all those cases in which the sacrifice of the child was demanded, the presenting part of the fœtal head was perforated with the trepan-shaped perforator, the skull then crushed by the cephalotribe, and delivery completed by extraction with the same instrument.

In the Lying-in House cephalotripsy was resorted to in 10 of the 62 cases—17 per cent.—but less frequently, in only 5 per cent. of the out-door cases.

TABLE IX.—136 CASES OF HEAD PRESENTATION COMPLICATED WITH PROLAPSE OF THE CORD.

Lying-in House.		Out-Door Department. (Cases in which operation was resorted to.)	
Cases of Prolapse amenable to treatment.....	20	Cases of Prolapse amenable to treatment ...	91
Cases of Prolapse not amenable to treatment as such :—		Cases of Prolapse not amenable to treatment as such :—	
Highly contracted pelvis. Cephalotripsy.....	10	(Cephalotripsy).....	12
Placenta prævia .....	2		103
Child dead when received.....	3		
Prolapse of pulseless cord.....	1		
	—		
	10		
	30		

II. *Treatment of Head Presentations.*—Such were the operations employed in the treatment of our prolapse cases, and in transverse, shoulder, and breech-first presentations no choice is given us as to the method of operation; the skill of the accoucheur is here shown by a careful preparatory treatment, and the judicious selection of the time of operation.

In head presentations only is a wider range given to the treatment directed toward the preservation of the child, and it is in these cases that the course pursued in the Berlin Lying-in House and Out-door Department varies somewhat from that adopted by most German obstetricians, especially those of the present day.

In order to demonstrate this more readily, I have compiled those uncomplicated cases of head presentation in which the treatment was confined to the prolapse of the cord, and directed solely to the preservation of the child.

Table X. gives us 111 such cases, that may be considered pure and uncomplicated cases of prolapse of the funis; although they embody a number of moderately contracted pelvises; it shows that the life of the child was saved in 65 per cent. of the cases, a very handsome result, being equally favorable among the 91 out-door and the 20 lying-in house cases.

TABLE X.—111 CASES OF PROLAPSUS FUNICULI WITH HEAD PRESENTATIONS, UNCOMPLICATED AND AMENABLE TO TREATMENT.

Treatment.	20 Lying-in House Cases.			91 Out-door Cases.			Total 111 Cases.		
	Number of Cases.	Saved.	†	Number of Cases.	Saved.	†	Number of Cases.	Saved.	†
Postural treatment.....	6	5	1	17	12	5	23	15	8
Reposition of cord.....	6	3	3	17	12	5	23	15	8
Forceps.....	1	.....	1	26	13	13	27	13	14
Version, with extraction.....	7	5	2	48	34	14	55	39	16
	65 per cent. saved.			65 per cent. saved.			65 per cent. saved.		

Here also turning truly proved “the master-stroke of the obstetric practitioner,” being resorted to most frequently, and proving most successful, the child being saved in 70 per cent. of the cases. We see the forceps brought into requisition next, in 27 cases resulting less favorably, not more than 50 per cent. proving successful. Reposition of the cord gave an average result, preserving the child in 65 per cent. of the 23 cases in which it was resorted to.

It is scarce necessary to state, what figures so plainly show, that version, preceded by judicious postural treatment, is the method to be followed which promises most for the life of the child in prolapse of the cord when complicating head presentations; of such cases we have so large a number, and so favorably developed, that the undeniable logic of facts and figures, far more than theoretical reasoning, sustain me in the high importance I attach to this operation. At what period and to what extent reposition may be attempted, we have already seen.

Hildebrandt, who greatly favors the latter operation, bases his theories on 195 cases compiled from those of Hohl, Grenser, Elsaesser, Braun, and others, head presentations, in which 116 of the children were saved, 51 per cent. He has, of course, only

taken such cases in which the treatment was directed solely to the presentation of the child, and comparatively simple cases, as the frequency of reposition and of spontaneous delivery shows. These cases may be compared with our 111 simple cases of head presentation (Table X.) which proved far more successful, 65 per cent. of the children being saved.

CASES COMPILED BY HILDEBRANDT.

	Number of cases.	Saved.	†
Reposition .....	111	73	38
Turning, with Extraction .....	26	12	14
Forceps .....	31	8	23
Spontaneous delivery .....	27	15	12
	195	108	87

In these cases of Hildebrandt's, turning was but rarely resorted to, and with very unfortunate results. Equally unsatisfactory are the results of this operation as given by other authorities. So Michaelis, in discussing the treatment of prolapse of the cord as adopted in various lying-in institutions, points to the fatal results of turning in order to let the reposition appear, by contrast, in so much fairer a light.

	Number of cases.	Saved.	†	} 24 per cent. saved.
Postural treatment .....	10	4	6	
Turning, followed by Extraction .....	20	4	16	
Forceps .....	16	3	13	
	46	11	35	

It seems indeed strange that the operation of turning by the feet, in head presentations complicated with prolapse, should be so disparagingly spoken of by most authorities, and should have given them such unhappy results, whereas in our cases it was mainly this very same operation which enabled us to save an unusually large number of the children imperilled by that dangerous accident.

Hohl, with his very unfavorable results, saving but 30 in 95 cases of prolapse, speaks most discouragingly of the operation, directly asserting that by turning after escape of the wa-

ters a living child was never delivered; he would only turn when the membranes are still intact. Very good, when possible; but under such favorable circumstances we must not turn by the feet unless the os is fully dilated, but by external manipulation, an operation as yet but little practised, which will yield most excellent results when more thoroughly studied and more freely applied. This method of turning is called for in head presentations when the cord is found presenting and the os but imperfectly dilated.

No more do Hohl's results speak in favor of his theory of not operating while the pulsation of the cord is still unimpaired: such teachings are dangerous; it is imperative upon us to operate as soon as labor has so far advanced that we may expect to operate successfully and deliver the child alive.

I should deem it criminal neglect to hesitate until the very last moment, to wait until the pulsation of the foetal heart becomes faint, and life is oozing away. In the 12 spontaneous head-first deliveries observed in the Lying-in House, reposition of the cord had been practised in 6, yet only 3 of the children were saved; whereas of the other 6 cases, in which protection for the cord was sought by postural treatment alone, 5 escaped, a result which again admonishes us to devote more careful study to this method of treatment than is at present accorded to it.

The time of operation can but rarely be chosen by the accoucheur, the case being but too often given into his hands at the very last moment, and he must act as the stage of labor and the condition of the child demand, and act at once; postural treatment with membranes still intact can therefore but rarely be practised.

The patient usually comes under observation when advanced in labor, when the waters have escaped, and the cord has prolapsed, and now, if the os be sufficiently dilated, and the head unable to enter the brim, or still high in the pelvis, turning by the feet is in place, especially if the pelvis be a somewhat irregularly contracted one, as the occiput may then be guided through the more spacious part of the canal. Should the forceps be applicable, we must not wait until the pulsation of the foetal heart grows faint, but seize upon the auspicious time, while the child is still vigorous, and extract, administering

chloroform to complete surgical anaesthesia, just as we would in turning. Worse still it is if the waters have escaped, the parts being still rigid, the os not dilatable; in this case, provided the head present a normal position, reposition may be attempted; if successful, it must be followed by postural treatment: if not, it is equally postural treatment to which we must resort as our only chance to save the cord from compression until the forceps or turning is possible.

#### H. RÉSUMÉ.

In conclusion, I will sum up in a few words the facts attained and the laws established by the examination of our prolapse cases.

The causes of the prolapse of the umbilical cord have mainly proved to be such circumstances as prevent the complete filling of the pelvic brim, and the close adaptation of the lower segment of the uterus to the presenting part. One of the more important of these circumstances is the shape of the presenting foetal part itself, and we thus find that foot presentations are most frequently complicated by prolapse, whereas vertex presentations are least threatened.

The foetal appendages are of secondary and minor importance; undue length of the cord, its marginal insertion or attachment of the placenta low down in the uterus can never be direct cause of the accident; excess of liquor amnii is alone to be feared.

Some stress is to be laid on abnormality in shape and position of the womb, much more upon twin births. More dangerous than any of these is the contracted pelvis, which I have proved by measurements and numbers to be the main cause of prolapse of the funis, directly and indirectly; a fact hitherto generally accepted, but never as yet clearly established. Another such vague, general statement, that the prolapse is by far more frequent among multiparæ than among primiparæ, our cases disprove; they show that primiparæ are, comparatively speaking, almost as frequently afflicted as multiparæ.

The law governing the location of the prolapse is of importance, and here for the first time touched upon; it will, I trust, be verified by the investigation of other observers.

The post-mortem examinations revealed only the lesions due



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CIRCUM.			CHILD.						
L-in H. Case No.	Age.	Mode of Delivery.	Living or Dead.	Male or Female.	Weight in Grammes.	Dimensions of the fetal Head.	Condition after Birth of Mother.	Condition after Birth of Child.	Notes and Post-mortems.
25 32		1-perforation : phalotripsy.	Dead.	♂	4,183	.....	Ruptura uteri : peritonitis : death.	.....	Patient was brought into the L-in H. in a state of collapse; the fetal head firmly wedged in the pelvis; tympanitis uteri.
26 31		2-perforation when the os was only 4.0 cm. large.	Dead.	♀	3,250	.....	Recovery.	.....	
27 28		6-ontaneous : cord coiled tightly around neck.	Living.	♂	3,533	Ant. tr., 8.1 Post. tr., 9.4 Long., 12.1 Long diag., 13.5 Short diag., 10.8	.....		
28 22		1-ontaneous : manual delivery of head.	Living.	♂	4,750 1,683	Ant. tr., 6.7 6.7 Post. tr., 8.1 8.1 Long., 10.1 10.1 L. d., 12.1 12.1	.....		
29 37		1-perforation : excision of the bones of the head.	Dead.	♂	2,483	without brain.	Speedy recovery.	.....	
30 23		1-ontaneous.	Dead.	♀	.....				The abortus was caused by a fall.
31 35		3-ontaneous.	Living.	♂	3,133				
32 24		1-ontaneous : manual delivery of head.	Living.	♀	3,070				
33 22		1-version : extraction.	Living.	♂	3,750	Ant. tr., 7.5 Post. tr., 8.5 Long., 11. Long diag., 12.			
34 28		2-version in left side position upon right foot.	Living.	♀	2,455	Ant. tr., 7.5 Post. tr., 9. Long., 10. Long diag., 12.			Escape of waters at a very early period, caused by excessive hard work.
35 22		1-ontaneous.	Dead.	♂	2,570	Ant. tr., 7. Sup. tr., 8. Long., 12. Long diag., 13. Short diag., 11.			

Case	Age	Sex	Condition	Duration	Onset	Progress	Termination	Remarks
22332	2	Female	Obstetric; ant. post.	26	Inf. tr., contracted.	Sup. tr., 27. months.	27. months.	26. months.
2331	6	Female	Natural.	26.5	Inf. tr., 27.5.	Sup. tr., 27.5.	27.5.	27.5.
2434	2	Female	Natural.	25	Inf. tr., contracted.	Sup. tr., 25.	25.	25.
2527	2	Female	Natural.	26	Inf. tr., 26.	Sup. tr., 26.	26.	26.
2642	8	Female	Natural.	26	Inf. tr., 26.	Sup. tr., 26.	26.	26.
27	4	Female	Chilbirth.	23	Inf. tr., 23.	Sup. tr., 23.	23.	23.
2838	9	Female	Natural.	27	Inf. tr., 27.	Sup. tr., 27.	27.	27.
29	4	Female	Natural.	25	Inf. tr., 25.	Sup. tr., 25.	25.	25.
3043	12	Female	Natural.	27	Inf. tr., 27.	Sup. tr., 27.	27.	27.
3130	1	Female	Natural.	23	Inf. tr., 23.	Sup. tr., 23.	23.	23.
3236	6	Female	Natural.	23	Inf. tr., 23.	Sup. tr., 23.	23.	23.
3338	4	Female	Natural.	30	Inf. tr., 30.	Sup. tr., 30.	30.	30.
3431	8	Female	Natural.	27	Inf. tr., 27.	Sup. tr., 27.	27.	27.
3536	3	Female	Natural.	27	Inf. tr., 27.	Sup. tr., 27.	27.	27.
3636	2	Female	Natural.	26	Inf. tr., 26.	Sup. tr., 26.	26.	26.
3732	2	Female	Obstetric; ant. post.	26	Inf. tr., 26.	Sup. tr., 26.	26.	26.

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### B. Ninety-eight Out-door Cases.

[illegible]



CIRCUMST.		CHILD.							
I. in II. Case No.	Age. No. of Children.	Mode of Delivery.	Living or Dead	Male or Female.	Weight in Grammes.	Dimensions of the foetal Head.	Condition after Birth of Mother.	Condition after Birth of Child.	Notes and Post-mortems.
11 36	9	Rupture of membrane; version; ex- traction.	Dead.	♂	.....	Ant. tr., 8. Post. tr., 9. Long., 11. Long diag., 13.	Good.	.....	Funis 140.
12 26	5	ersion; ex- traction.	Living.	♂	.....	Ant. tr., 7.5 Post. tr., 9. Long., 11. Long diag., 12. Circ., 34.5	Good.	Good.	Funis 41.
13 26	8	Extraction.	Living.	♀	4,000	Ant. tr., 8. Post. tr., 10. Long., 12. Long diag., 13.2 Circ., 37.	.....	.....	Funis 65.
14 31	5	Forceps.	Living.	♂	.....	.....	Good.	Good.	Funis 85.
15 31	2	ersion; ex- traction.	Dead.	♂	.....	.....	Good.	.....	.....
16 34	2	ontaneous.	Dead.	♂	.....	.....	Good.	.....	.....
17 32	2	ontaneous.	Dead.	♀	.....	Ant. tr., 7. Post. tr., 8.5 Long., 11. Long diag., 12. Circ., 35.	.....	.....	Funis 48.
18 25	1	Extraction.	Living.	♂	.....	.....	.....	.....	.....
19 28	1	ersion; ex- traction.	Dead.	.....	.....	.....	.....	.....	Syphilis.
20 25	1	ontaneous.	Dead.	♀	.....	.....	.....	.....	.....
21 27	1	ersion; ex- traction.	Living.	♂	.....	.....	Good.	Good.	Funis 80.



Case No.	Circumstances.	Child.	Notes and	
			Condition	Condition
70 28 4	Full term.	Natural.	Simple contracted.	Simple contracted.
	Strong.			
71 32 1	Weak.		Haemorrhagic: lorio-sco-	Haemorrhagic: lorio-sco-
72 23 1	Strong.		Simple contracted.	Simple contracted.
73 28 4	Good.	Tedious.	Haemorrhagic: ant. post.	Haemorrhagic: ant. post.
74 30 5	Full term.	Tedious.	Haemorrhagic: ant. post.	Haemorrhagic: ant. post.
75 30 5	Full term.	Natural.	Ant. post. contract.	Ant. post. contract.
	Strong.			
76 33 1	Full term.	Full term.	Ant. post. contract.	Ant. post. contract.
	Strong.			
77 30 2	Full term.	Full term.	Ant. post. contract.	Ant. post. contract.
	Weak.			
78 36 2	Full term.	Full term.	Haemorrhagic: ant. post.	Haemorrhagic: ant. post.

CIRCUMSTANCES RELATING TO THE MOTHER.				COURSE OF LABOR.				TREATMENT.		OUTCOME.	
No. of children.	Age.	General Remarks of the Mother.	Previous Labors.	Duration of Gestation.	Quality of the Placenta.	Size of the fetus when the discovery of the diameter in Montpelier.	Position.	Length.	From the Discovery of the Diameter up to the Delivery.	Time of Delivery.	Remarks on the Child.
1	25	Healthy; ant. post. contracted.	Somewhat difficult.	Full term.	Painful; spasmodic.	20 cm.	II. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
2	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
3	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
4	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
5	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
6	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
7	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
8	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
9	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
10	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
11	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
12	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
13	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
14	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
15	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
16	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
17	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
18	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
19	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
20	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
21	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
22	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
23	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
24	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
25	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
26	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
27	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
28	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
29	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
30	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
31	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
32	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
33	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
34	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
35	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
36	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
37	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
38	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
39	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
40	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
41	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
42	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
43	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
44	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
45	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
46	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
47	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
48	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
49	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
50	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
51	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
52	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
53	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
54	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
55	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
56	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
57	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
58	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
59	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
60	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
61	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
62	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
63	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
64	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
65	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
66	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
67	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
68	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
69	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
70	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
71	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
72	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
73	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
74	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
75	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
76	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
77	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
78	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
79	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
80	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
81	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
82	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
83	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
84	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
85	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
86	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
87	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
88	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
89	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.2; L. ob. 23.	Without assistance.	Full term.	Suspended.	20 cm.	I. Vertex.	Large pulsing loop.	Forceps.	Dead.	Perforated uterus; death.
90	25	Sup. tr. 31.5; Inf. tr. 31.5; Ant. post. 31.5; Trach. 32.									



TREATMENT.		CHILD.						
Recovery up to 7.	Mode of Delivery.	Living or Dead.	Male or Female.	Weight in Grammes.	Dimensions of the fetal Head.	Condition after Birth of Mother.	Condition after Birth of Child...	Notes and Post-mortems.
m.	Spontaneous.	Dead.	♀	.....	.....	.....	.....	.....
at- l.	Spontaneous.	Dead.	♀	.....	.....	.....	.....	.....
.....	Version: extraction.	Living.	♂	.....	.....	Good.	Death from trismus.	Premature loosening of placenta.
.....	Extraction.	Living.	♀	.....	.....	.....	.....	Funis 82.
mem- bered by y.	Version; extraction.	Dead.	♂	.....	.....	Parametritis: recovery.	.....	Funis 44.
.....	Version; extraction.	Living.	♂	.....	.....	Good.	Good.	Funis 85.
.....	Forceps.	Dead.	♂	.....	.....	Good.	.....	.....
.....	Forceps.	Dead.	♀	.....	.....	Good.	.....	.....
ection.	Version: extraction.	Living.	♂	.....	.....	Good.	Good.	Funis 72.
mmone- te.	Spontaneous.	Dead.	♂	.....	.....	.....	.....	Funis 66.
	.....							

CIRCUMSTANCE				CHILD.							
L-in H. Case No.	Age.	No. of Children.	No. of Abortions.	External the	Living or Dead	Male or Female.	Weight in Grammes.	Dimensions of the foetal Head.	Condition after Birth of Mother.	Condition after Birth of Child.	Notes and Post-mortems.
8138	9	..	Ant. post. Inf. tr.,	Living.	♀	.....	.....	.....	Good	.....	



to death from asphyxia, nothing characteristic for death caused by prolapse of the cord.

The prognosis we can give is somewhat better than generally allowed; most favorable for foot presentations, after these for shoulder and transverse presentations, while vertex presentations are more dangerous than any; the case being, under all circumstances, more threatening when occurring in a primipara.

In the treatment of our cases the high importance of the postural method has been developed, more as an adjuvant, however, than as a method in itself of dealing with the prolapse.

Version is comparatively the most successful of all operations, and should be more frequently resorted to when any choice of method is given, as in head presentations: the application of the forceps and reposition of the cord are less to be relied upon; but whatever may be the course determined upon, it must be borne in mind that the success of all operations, by which we seek the preservation of the child, whose life is threatened by compression of the prolapsed cord, is in a measure dependent upon the judicious use of chloroform, its application to full surgical anæsthesia.

## EDITORIAL.

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IN assuming editorial charge of THE JOURNAL OF OBSTETRICS I am well aware that I have undertaken a task, which, if carefully and conscientiously performed, as I intend it shall be, is likely to prove both arduous and difficult.

I trust I may not be considered presumptuous, if I confess my intention not only to preserve the valued features of the JOURNAL, which it has acquired under the guidance of my esteemed friend and predecessor, but also to endeavor to give it, in time, a scientific rank second to none of its European contemporaries. This object, in my opinion, will be best attained by a careful and discriminating selection of original communications, by accepting only those which contain *original* ideas and researches, or exhaustive and thorough résumés of the subject treated of, or able discussions on still undecided questions, omitting as much as possible mere reports of cases unaccompanied by comments or remarks, and all inexact and unscientific observations.

The burden of providing the JOURNAL with such original articles rests with the medical profession in America, not so much with the general practitioner as more particularly with the specialist, through whose efforts the art of Gynæcology in this country has attained its present exalted position, and whose interest and duty it is to encourage a journal devoted solely to his specialty; to them I appeal to aid me in realizing my desire of making THE JOURNAL OF OBSTETRICS known at home and abroad as the acknowledged organ of American Gynæcology.

The other departments of the JOURNAL will be conducted as heretofore, care being taken to prevent one chapter from being crowded out by the other.



THE QUARTERLY LIST OF LITERATURE, which was commenced in the last number, and will be made as full and complete as possible, has seemed to me a useful addition for reference and survey. As has been the case during the past year, the QUARTERLY REPORTS will consist principally of extracts from *foreign*, especially *Continental* journals, which are less generally known or read in this country than our native or the English periodicals. If abstracts of German articles should occasionally preponderate, the reason must be sought for in the number, accessibility, and superior excellence of, not in an exclusive partiality on my part for, the medical literary productions of that country. Verbatim translations will appear as rare exceptions, and only when called for by the extreme value of the article and the inability properly to give its sense by an abstract. Although occasionally a number may unavoidably contain an unusual quantity of matter of one kind, the rule will obtain to give each of the three branches—Obstetrics, Gynecology, and Pædiatrics—an equal share of each number.

In future, illustrations on stone and wood will be added whenever necessary or useful.

The constantly growing demand in this country for a more thorough and scientific pursuit of medical knowledge, in my opinion, sufficiently warrants the course to be pursued in the future management of the JOURNAL. I have no fears that the efforts of the JOURNAL in this direction will remain unappreciated by those members of the profession, who have the interests of science at heart.

Since my assumption of the editorial duties, I have been gratified by the increased number of original communications offered and received. I trust this auspicious beginning may be a favorable augury for the future success of the JOURNAL, and that it will receive even greater support and encouragement than it has enjoyed in the past.

## TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

REPORTED BY PAUL F. MUNDE, M.D., SECRETARY.

STATED MEETING, MARCH 3, 1874. DR. THOS. ADDIS EMMET, VICE-PRESIDENT, IN THE CHAIR.

### CASE OF UTERINE FIBROID REMOVED ACCORDING TO A NEW PRINCIPLE OF OPERATION.

DR. EMMET reported a case of fibroid tumor of the uterus removed by him the day before. The patient had been suffering from excessive metrorrhagia during the past month, which had been controlled only by the constant use of styptic injections. The uterus was anteverted, and its cavity occupied by a fibrous tumor of the size of a fist; the sound could be introduced to the depth of five inches posteriorly and of three inches anteriorly. Suppositories of gelatine, containing each 16 grains of Squibb's aqueous extract of ergot (equivalent to about 100 grains of powdered ergot) were introduced into the rectum, where they produced but little effect, and then daily, during the last ten days, into the cavity of the uterus itself with marked beneficial result. The uterus, which at first had been more elongated and pear-shaped, now became broad at its fundus, where it measured no less than four inches; the tumor thus approached the internal os, although its broad attachment to the uterine wall was in no way changed. The great difficulty was to get an instrument or a loop behind or around the tumor, in order to effect its removal. Dr. Emmet retroverted the uterus, seized the fibroid with a double tenaculum, and proceeded to draw it down towards the vulva, in which attempt he succeeded after about half an hour's steady traction, removing portions of the tumor with the scissors as it became attainable. When the fibroid had been brought down to the vulva, Dr. Emmet thought he was inverting the uterus, at which prospect he was not alarmed, for he knew that he could easily return it at once; he found, however, that the uterus had contracted behind the tumor as it was drawn down, and had thus by its individual efforts enucleated the base of the tumor, and at the same time prevented hemorrhage, and made it necessary only to divide the capsule of the fibroid with the scissors in order to remove the whole growth. During the whole operation, which lasted about

an hour and a half, hardly a drachm of blood was lost, and that came from the laceration of the fibroid by the double tenaculum. The base of the tumor measured about two inches in diameter; after its removal only a slight depression could be felt at the fundus to indicate the spot where it had been attached. After the operation he followed his usual rule of washing out the uterus with warm water, and painting the whole of its cavity with Churchill's tincture of iodine, as a precaution against septicaemia.

This is the most difficult case of the kind he has seen. A few years ago he removed a similar tumor in the same manner, but did not fully understand the *rationale* of the operation until yesterday. The steady traction used arrests hemorrhage, because it excites the uterus to contract behind the tumor as it is drawn down, and thus to compress the bleeding vessels, besides bringing the fibroid nearer and more convenient for removal. It is not the forcible traction of the fibroid towards the os, that is in the direction of the least resistance, but the *vis a tergo*, the contraction of the uterus behind the tumor, which gradually lifts the latter from its bed and enucleates it. This steady traction may be of service, if repeated at regular intervals, in bringing uterine fibroids within reach and making them amenable to operation, and may, perhaps, even accomplish their gradual enucleation.

DR. BARKER related the case of a large fibroid tumor operated upon by him, with Drs. Budd and Conant in 1855. The tumor was so large, that, after it had been drawn down to the vulva with vulsella forceps, portions of it had to be removed in order to allow its passage through the vulva. The uterus was inverted, and when the pedicle, which measured two and a quarter inches in diameter, was divided the uterus became spontaneously reinverted, with a sound like that produced when a cork is drawn from a bottle.

#### HYPODERMIC INJECTION OF ERGOTINE.

DR. BARKER inquired as to the experience of the Society with hypodermic injections of ergotine in fibroid tumors. He had employed them in seven cases, always with the production of large abscesses at the point of puncture, and with no satisfactory results. He has seen more beneficial effects from the injection of fluid extract of ergot into the rectum.

DR. JENKINS stated that Dr. Dean, of Rochester, had told him at the meeting of the State Medical Society this year, that he had in two cases injected the fluid extract of ergot directly into the parenchyma of the cervix uteri, without producing abscesses,

and with marked beneficial results; in two other cases he had made the injections into the cavity of the uterus, also with good results.

#### CASE OF PURPURA RHEUMATICA.

Dr. MUNDE related a case which would properly come under the head of cutaneous diseases, but inasmuch as it occurs almost exclusively in persons under the adult age, may be considered to come within the limits of this Society.

A boy, eleven years of age, of slender, strumous habit, although his parents reported him as having always enjoyed good health, presented himself for treatment in the service of Dr. Munde, at the Free Dispensary for Sick Children, on February 13th last. He said that while rapidly ascending the stairs the day before, he had suddenly felt a severe pain in his left leg below the knee, which almost prevented him from completing the ascent of the stairs. The left calf was found to be much swollen and very painful; a liniment was applied without relief. The next morning the leg below the knee was covered with red spots. On seeing him the same afternoon, Dr. Munde found the left calf swollen, painful, tense, and both legs below the knee covered with petechiæ of various sizes; the joints were not affected. Although the diagnosis of purpura was made, the nature of the swelling of the left calf remained obscure. A saline laxative and a poultice to the inflamed leg were ordered. On February 16th the boy again presented himself: the swelling and inability to walk had entirely disappeared, but the petechiæ still remained; cod-liver oil and the syrup of the iodide of iron were ordered. During the night of the 19th the boy was seized with violent pain in the bowels, which was pronounced by a neighboring physician to be due to peritonitis. On seeing the patient the next day, Dr. Munde found the pulse to be sixty-eight, the skin cool, the abdomen sunk, and painful only on pressure in the right iliac fossa; there was some diarrhœa. The case was evidently only one of acute gastro-intestinal catarrh, which yielded at once to emetics and opium, and a chloroform and soap-liniment stupe to the abdomen. Both legs below the knee, and the posterior surface of both thighs, the nates, and both forearms were covered with large, florid petechiæ, which were not changed by pressure or friction. There was no swelling of the joint, no sign of rheumatism; quinine and camphor—one grain each *ter die*—were ordered. As the exact nature of the case was not quite clear, Dr. Munde mentioned it to Dr. L. D. Bulkley, who, as a specialist, recognized the affection as purpura or

peliosis rheumatica,—a rather rare affection, which, to Dr. Bulkley's knowledge, had not been described in New York before. On seeing the patient two days later, this diagnosis was confirmed without fail, although the petechiae had become much paler, and were beginning to disappear. February 27th the boy came to the Dispensary again, and the petechiae were found to have entirely disappeared; his appetite was good, and no farther treatment necessary, with the exception of tonics for his general health.

Peliosis rheumatica is a perennial affection, liable to return in the spring or autumn; it generally lasts from two to eight weeks, and appears to be of epidemic nature, similar to herpes and erythema papulatum, gyratum or urticans. It usually commences in the lower extremities, which are covered with spots of different shades of red, and spreads over the rest of the body. The knee-joints generally become œdematous and painful, and the affection may thus simulate rheumatism.

#### REMARKS ON SCARLATINA.

DR. REYNOLDS mentioned an epidemic of scarlatina which he had witnessed in a public institution last month. Throat complications and diphtheritic patches were very frequent; generally, when they appeared—that is, about twenty-four hours after the appearance of the eruption—the latter would fade, the face assume a peculiar, absent expression, the eye become glassy, the pupil contracted, the pulse rise to 120, 130, or 160 beats in the minute, the temperature to  $104^{\circ}$  or  $106^{\circ}$ , delirium and general nervous prostration would ensue, the intensity of the poison appearing to crush the vitality of the system. Follicular pharyngitis, each follicle projecting as a distinct point, was common. He had just come from a case in private practice, in which the pulse this afternoon was 120, the temperature  $102^{\circ}$ ; now, at 9 P.M., the pulse is 130, the temperature  $106^{\circ}$ . The child will undoubtedly die before morning, being the third death from scarlatina in that family.

He thinks that more decision should be shown in isolating apparently convalescent cases or children who have not as yet been taken ill. Two children, who had been sick with angina and indistinct symptoms of scarlatina, had recovered, and were nursing their brothers and sisters sick with the same disease, were subsequently taken ill again with indubitable scarlatina. When scarlatina and measles occurred at the same time in public institutions, Dr. Reynolds has been frequently considerably puzzled in the beginning to determine which was measles and which scarlatina. He has seen some children run com-

pletely through scarlatina and measles both during his service of one month.

DR. BARKER said that he had, in several instances, used the sulphites as a prophylactic against scarlatina, at once giving the other children in the family fifteen grains of the sulphite of magnesia or soda three times a day. Although the number of cases is still too small to permit of any definite conclusion, still, in the few cases in which he had tried the sulphites, the remaining children escaped the disease.

STATED MEETING, MARCH 17, 1874. THE PRESIDENT, DR. PEASLEE, IN THE CHAIR.

#### TWO CASES OF TRACHEOTOMY.

DR. POOLEY related two cases of tracheotomy performed by him. The first child, four years of age, had a croupy cough when Dr. Pooley was called; inhalations of steam were ordered. The next morning it felt better, but there were diphtheritic patches on the tonsils and epiglottis; the next day it was much worse, there was great dyspnoea, and tracheotomy became necessary, which afforded immediate relief. When the trachea was opened a complete circular cast of the canal, about one inch in length, was expelled through the wound; this cast Dr. Pooley exhibited to the Society. The wound became covered with diphtheritic exsudation, the discharge from which eroded the skin of the neck on both sides almost to the spinal column. With the exception of a light paresis of the lower extremities, the child is now doing well.

The second operation was performed the day before on a child fourteen months old, which was relieved by the tracheotomy, but died to-day. The exsudation extended into the bronchi; temporary relief was obtained by throwing lime-water into the larynx by means of an atomatizer.

#### A SPECIMEN OF DYSMENORRHOICAL MEMBRANE.

DR. THOMAS presented a specimen of a complete dysmenorrhœal membrane, or cast of the uterus, a similar one being passed by the patient about every third month, and smaller shreds every month. If it were not for the membranes, Dr. Thomas would consider her a perfectly healthy woman. The lady is married, but has never been pregnant.

DR. C. F. RODENSTEIN asked whether a woman can ever become pregnant while passing such casts. A patient of his, who had passed casts during nine months, then became pregnant, and was delivered by him of an acephalous monster.

DR. PEASLEE said that high authority had decided that such casts are always the result of impregnation. This is certainly not the case; but while dysmenorrhical casts are being passed, pregnancy is, of course, impossible. After such casts are no longer passed, he does not see why the patient should not become pregnant. He considers the affection to be only chronic hypertrophy and inflammation of the uterine mucous membrane, recurring at each menstrual period.

A SYRINGE FOR THE REMOVAL OF THE MUCOUS PLUG IN THE  
CERVIX.

DR. THOMAS exhibited a syringe with a long nozzle and a piece of rubber tubing projecting half an inch attached to the nozzle, for the purpose of withdrawing the tenacious mucous plug, frequently obstructing the cervical canal, which often cannot be removed by an ordinary syringe. The end of the tubing is introduced as far as the internal os, and it is surprising into how small a cervical canal it can be passed.

SPECIMEN OF FATTY DEGENERATION, ATROPHY, AND APOPLEXY OF  
THE PLACENTA.

DR. PEASLEE exhibited a placenta derived from one of twins born at the seventh month. The other placenta is exactly similar; both are much atrophied and smaller than should be at that period, very thin, in places almost transparent, and contain one or two large clots of blood diffused through the tissue of the placenta, evidently placental apoplexy. The whole length of the umbilical vein is likewise occupied by a tolerably firm clot. The degeneration of the placenta is most probably of a fatty nature, and syphilis, even if not ascertainable, as in this case, the probable cause. The motions of the children ceased about a week before delivery, and both children were born dead.

CASE OF INTERSTITIAL PREGNANCY.

DR. JANVRIN related a case of probable interstitial foetation, which occurred in his practice. The lady had had two previous children; six years before, she suffered from a uterine polypus, which came away spontaneously. Her menstruation was regular until March, 1873, when Dr. Janvrin first saw her; it then lasted ten days. May 3d she had considerable pain and violent flooding. On examination the uterus was found to be retroflexed, as large as at the second month of pregnancy, and a fibroid or polypus was diagnosed. The uterus was replaced, the

patient being in the knee-elbow position, and great relief experienced therefrom; the flooding diminished and the os internum became closed. June 9th she had a similar attack, and the diagnosis of fibroid seemed certain. Dr. Thomas saw her in consultation, and suggested that the case might be one of normal pregnancy. The uterus was again replaced; slight flowing continued till July 1st, when the discharge of blood again became copious. Dr. Thomas suggested tubal pregnancy, for it certainly was not a normal foetation. Dr. Janvrin felt so certain that there was no foetus in the uterus, that he passed the sound and found the uterine cavity to be  $3\frac{1}{2}$  inches long, pointing slightly towards the right side. He also thought it might be tubal or, perhaps, interstitial pregnancy, for the enlargement behind, and to the left of the uterus was firmly connected with the latter, as if belonging to it. About the end of August, Dr. Peaslee also saw the patient, and thought it a case of fibroid. At this time the patient thought she felt slight foetal movements. The tumor increased in size until November 1st, when the supposed foetal motions ceased; no foetal heart-sounds could ever be detected. Dec. 19th, Dr. Janvrin was called, and found that uterine contractions like regular labor-pains were present. The sound was passed to the depth of five inches. The diagnosis of a large uterine fibroid was again made. In the beginning of last January, hypodermic injections of ergotine, containing two grains each, were made every other day. The tumor continued to decrease until, about the middle of February, it was only one-third its original size. Two weeks ago the lady had a violent attack of diarrhoea, the first discharges of which were thrown away. In the evacuations of yesterday and to-day were found the bones which Dr. Janvrin exhibited to the Society, and which evidently are derived from the hand of a probably five months' foetus. The finger introduced into the rectum, can just reach the border of the opening from which these bones were undoubtedly discharged. Dr. Janvrin thinks that the greater portion of the foetus is still remaining in the abdomen; the tumor now has a rounded, somewhat irregular shape.<sup>1</sup>

DR. THOMAS said that he had seen an entirely similar case in which the foetus was gradually discharged per rectum. No diagnosis was made. The patient still has a hard irregular mass in the pelvis. A case of supposed intra-mural pregnancy was seen at the Strangers' Hospital in this city several years ago. When the woman entered Dr. Thomas' service she was un-

<sup>1</sup> This case being still *in suspensio*, a full report of it is as yet impossible, but will be published in a subsequent number of the JOURNAL.



doubtedly pregnant near the end of the ninth month; labor apparently came on, the pains lasted about twelve hours and then ceased, and never returned. The abdomen gradually grew smaller, although still larger than normal when last seen, but no fetus appeared. The uterus was sounded, and found to be five inches in length and empty. The woman died at her home a year or two ago, but unfortunately no autopsy was made.

#### SARCOMA OF THE UTERUS, WITH FOUR CASES.

Dr. THOMAS read a paper on sarcoma uteri, and related four cases which had come under his notice.<sup>1</sup>

STATED MEETING, APRIL 7, 1874. DR. BYRNE, VICE-PRESIDENT, IN THE CHAIR.

#### CASE OF IMPERFORATE RECTUM.

Dr. POOLEY read a paper on a case of imperforate rectum, upon which he had operated by incision, but unsuccessfully, the child dying seven hours after the operation.<sup>2</sup>

Dr. JACOBI asked whether the pelvis was much smaller, or the bladder larger than usual (to both of which questions Dr. Pooley answered: No). What then was the pelvis occupied by, so as to render such deep dissection necessary to reach the rectum? He would think that the pelvis must either be smaller or filled with connective tissue, whereby the natural growth of the two ends of the intestine, the upper and lower, towards each other was impeded and prevented.

Dr. POOLEY said that the pelvis was occupied principally by firm connective tissue, which kept the rectum tightly bound down.

Dr. JACOBI said that the general sclerema mentioned by Dr. Pooley was in perfect accordance with the hyperplasia of the pelvic connective tissue, and seemed to prove that the rectal malformation was caused, first, by an inflammatory disorder inducing general sclerema and increase of connective tissue in the pelvis; and, secondly, by an arrest of development, the formation of the rectum having ceased about the time of the disappearance of the allantois.

Dr. POOLEY asked Dr. Jacobi whether such a complete transposition of the intestine (the caecum on the left, and the sigmoid flexure on the right side), as was found in this case, was common.

Dr. JACOBI answered that it was very unusual—as rare as to

<sup>1</sup> See May No. of the JOURNAL.

<sup>2</sup> See May No. of the JOURNAL.

find one or two flexures of the colon ascendens extending to the left side. The colon descendens is generally long, and may occasionally pass to the right and then again to the left side, and then into the pelvis, but a total transposition is certainly very rare.

Dr. POOLEY called attention to the practical importance of this transposition as regards operative interference, especially colotomy.

CASE OF CONGENITAL BILATERAL MALFORMATION OF THE EXTERNAL AUDITORY MEATUS IN A CHILD.

Dr. POOLEY also presented two photographs of a little girl with a congenital malformation of the external auditory meatus and auricle on both sides, from the practice of his brother, Dr. Thomas R. Pooley, of this city. Not only the soft external auditory meatus, but also the bony canal, were closed; as was discovered during an attempt to open the passage made in Turkey, where the child then lived. The hearing of the child was quite good, notwithstanding.

A CASE OF OVARIAN TUMOR COMPLICATED WITH ASCITES; OVARIOTOMY, RECOVERY.

Dr. PEASLEE exhibited an ovarian tumor removed by him recently. Dr. T. G. Thomas and other high authorities believe that the very rapid increase of fluid in ascites complicating an ovarian tumor indicates the malignancy of the latter. Dr. Peaslee has already stated in his book on diseases of the ovary that this opinion is incorrect, and cites the present case as an additional proof. The cause of the rapid increase of the ascitic fluid is the bursting of one of the cysts of the, of course, multilocular ovarian tumor, the papillæ lining the internal surface of which cyst then secrete into the abdominal cavity, the fluid contained in which is thus both ovarian and ascitic. A patient then operated upon stands the same chances of recovery as in any ordinary case of cystic disease.

In this case the abdominal enlargement was first noticed last October, and supposed to be ascites; the patient was tapped, and 40 lbs. of fluid were removed. The abdomen filled again very rapidly, and was soon as large as before. Dr. Peaslee first saw the lady about a month ago, and on examination per vaginam found an ovarian cyst in the pelvis. He advised ovariectomy, which was performed two weeks ago. An exploratory incision was first made, by which 35 lbs. of fluid were evacuated, and the hand was then introduced and a small ovarian tumor found, which, when removed entire, weighed about 4 lbs., and

measured  $4 \times 5 \times 6$  inches in diameter. A double ligature was applied and the pedicle being very short, the tumor was dissected off from it. A rubber tube was introduced for three days to give exit to the ascitic fluid which might form; after that period no more fluid was secreted, and the tube was removed. The patient is making a perfect recovery, the pulse never having been above 84.

DR. PEASLEE has seen but two cases of malignant cystovarium with ascites.

DR. JACOBI asked whether the fluid in the abdominal cavity generally increased rapidly after the rupture of the cyst, and whether its secretion might not cease for months or years.

DR. PEASLEE answered that it usually did not increase very rapidly, and might sometimes even cease augmenting for an indefinite period.

DR. BYRNE asked what was the cause of the rapid increase of the ascitic fluid in this case.

DR. PEASLEE said that he did not know, for the passive irritation of the small ovarian cyst seemed hardly to be sufficient; this is the first case in which he has seen ascitic fluid increase so rapidly. He would ask Dr. Jacobi to explain the cause.

DR. JACOBI said that he could give no satisfactory explanation. He had asked the previous question because he had a case in which the ascitic fluid had increased rapidly without apparent cause. The patient had suffered from gastric disorders for a number of years, and had been treated in Europe for ascites. Friedreich, of Heidelberg, had diagnosed partial cirrhosis of the liver. During the last four months the circumference of the abdomen had increased two inches, and now measures forty-one inches; the fluid reaches above the umbilicus. He has only been able to confirm Friedreich's diagnosis, but would be glad to find some encouragement for the belief that the ascites and its recent rapid increase is due to a small ovarian cyst.

DR. PEASLEE said that he would rather incline to the opinion, that the ascites in this case is due to cirrhosis; perhaps it may also be so in his own case, irrespective of the ovarian tumor. He has seen a case of ascites in which 30 lbs. of fluid were removed by paracentesis; the fluid slowly accumulated again, and was again removed by tapping, and the patient has since then, four years ago, been quite well, the ascitic fluid amounting to perhaps only four or five lbs.

#### A CASE OF CONSTRICTION OF THE COLON BY PERITONEAL BANDS AND IMPACTION OF FECES DURING PREGNANCY.

DR. CHAMBERLAIN exhibited a four-months' foetus enclosed in the membranes, which was removed post-mortem from a

lady whom he saw in consultation. When called, he found the abdomen of the patient much distended, very tympanitic, and distorted towards the right side. There was dulness on percussion over the ascending colon, only moderate dulness over the descending colon. The diagnosis was intestinal obstruction and impaction of fæces in the ascending colon. The possibility of this obstruction being caused by peritoneal bands was thought of. The indication was to evacuate the bowels. Four pints of oxgall and warm water were injected by hydrostatic pressure without producing an evacuation.

To relieve the excessive tympanites and facilitate further exploration, the intestines were tapped with the aspirator; on piercing the transverse colon, a moderate quantity of gas escaped, causing slight relief; when the ascending colon was tapped, only pultaceous fecal matter escaped. The exit of a gangrenous odor on perforating the abdominal cavity proper settled the question of operating. By a vaginal examination the woman was found to be in about the fourth month of pregnancy. She died yesterday of pulmonary œdema and exhaustion. At the post-mortem a tube was passed to the angle of the transverse and descending colon, which were found empty; above this point the colon was gangrenous. The transverse colon was bridged and constricted by two firm peritonitic bands passing to the small intestine. No traces of the punctures made by the aspirator could be found either on the peritoneal or mucous surface of the intestines. There was but little reddish serum in the abdominal cavity. If these peritonitic bands could have been diagnosed, would not laparotomy have been justifiable to allow of their division, which could easily have been effected, as they contained no vessels or important structures?

DR. CHAMBERLAIN would like to know whether this operation has ever been performed.

DR. POOLEY said that to his knowledge it had never been done.

DR. JACOBI said that laparotomy in such cases had always been performed for intussusception, but never for peritonitic constricting bands. The indication would certainly be the same. Hemorrhage from the bowels (suggested by Dr. Chamberlain as a diagnostic sign of volvulus) is not always a sure proof of the presence of invagination in the adult.

DR. PEASLEE also said that laparotomy certainly would be justifiable in such a case and for such a purpose.

A SPECIMEN OF AN INFANT UTERUS BICORNIS DUPLEX AND VAGINA SEPTA.

DR. MANN exhibited a specimen of a uterus bicornis duplex or bicameratus, or septus (Klob) and vagina septa, from an

otherwise entirely well-formed nine-months' fœtus. The cornua of the uteris are very distinct and widely separated. The depression in the centre of the fundus is very well marked, and the whole uterine, cervical, and vaginal canal divided into two equal halves by a firm septum.

STATED MEETING, MAY 5, 1874. THE PRESIDENT, DR. PEASLEE, IN THE CHAIR.

#### CANCER OF THE BREAST.

DR. PEASLEE exhibited a tumor removed from the breast of a lady, which caused no pain whatever, advice being merely sought on account of its presence, and the desire to know what it was. It was pronounced to be carcinoma, although the nipple was not retracted; one of the glands towards the axilla was felt to be considerably enlarged. Its removal was advised and accomplished by Dr. Peaslee, after the method usually adopted by him, as follows: A somewhat broad-pointed knife was introduced perpendicularly through the skin and adipose tissue until the gland was reached, and then carried rapidly along to the point where the incision was to cease; the gland itself was then divided by scraping with the back and point of the knife, until the pectoralis major was reached, whereby the vessels were torn through instead of being cut, and hemorrhage of any consequence was avoided. In this case, although the mass removed was quite large, and the glandular tissue very abundant, there were hardly two ounces of blood lost. Whenever it is necessary to lift up the tumor and raise its edge from the subjacent tissue, in order to be able to get the knife under it and dissect it away rapidly, Dr. Peaslee has found that a very good hold and firm leverage is obtained by screwing a corkscrew into the breast, and using it instead of the forceps, which hardly ever seize the bulky mass firmly and securely enough. Although this specimen has not yet been examined by the microscope, there is not the least doubt, from its appearance, that the diagnosis of cancer is correct. Some two or three enlarged glands besides the one felt before the operation were removed from the pre-axillary region. The patient had not the least trace of cachexia, appeared perfectly healthy, and there was no hereditary cancerous taint in the family.

Drs. Byrne, Peaslee, and Munde mentioned cases of far advanced carcinoma uteri, in which there was no cachectic appearance whatever, and Dr. Peaslee said that the exception, that is the absence of cachexia in the earlier stages of cancer, at least appeared to be quite as frequent as the rule, the presence of the cachexia.

## FIBROUS TUMOR OF THE BREAST.

DR. JACOBI exhibited a tumor from the breast of a lady who some six years previously had suffered from intense neuralgia in the lumbo-abdominal region, and the parts supplied by the superficial branches of the upper portion of the sciatic nerve. All the symptoms were referred by her to a tumor in the breast, which formed at the site of, and after an incised wound caused by a fall; this tumor the lady was very anxious to have removed, fearing it might be malignant, but Dr. Jacobi declined to operate, as there were no signs whatever of malignancy present. A number of weeks ago, however, the axillary glands began to swell; iodide of potassium was given, apparently without effect, and the operative removal of the tumor was then decided upon, and a day fixed. On examining the breast, however, on the day of operation, Dr. Jacobi found that the swelling of the axillary glands had disappeared, and, if he had not fixed the day, he would then have probably deferred the operation, or entirely withdrawn from it. As it was, he removed the tumor in the usual manner, and found it to be the same as diagnosed six years ago, viz., fibrous tissue proceeding from the old cicatrix, and surrounded by adipose tissue, thus presenting the history and peculiarities of the neoplasma, known as cheloid, and of course not malignant. Dr. Jacobi's object in presenting this case was to call attention to the supposed connection between the tumor in the breast and the neuralgia, upon which point there is still some doubt, inasmuch as such a connection is not unfrequently admitted. He does not think that there can be any direct connection between the cicatricial tissue in the breast and the neuralgia in this case, and would be inclined to be skeptical as to such a relation in any similar case.

## SARCOMA OF THE KIDNEY IN AN INFANT.

DR. JACOBI further presented a tumor taken from a child 19 months old, which died under chloroform in Dr. Krackowizer's office, a few days previously. When the child was seven or eight months old a tumor was noticed in the right side, which increased perceptibly. When Dr. Jacobi first saw the child it was a year old; in the right lumbar region was to be felt a firm elastic tumor as large as one and a half fists, not painful, round, slightly movable, not connected with but adjacent to the liver, more likely belonging to the right kidney; over the tumor there was dull percussion sound; between the liver and the tumor there was a narrow tympanitic line, whereby disease of the liver could be excluded. Dr. Jacobi thought it was carcinoma or

cystic disease of the kidney, the two most common kidney affections in young children. The tumor grew larger and larger; hæmaturia confirmed its connection with the kidney. The parents were told that if it continued to enlarge it would be fatal to the child, and they therefore desired its removal. For the purpose of a more thorough investigation the child was narcotized, Dr. Krackowizer pouring ten drops of chloroform on a handkerchief, and then adding a few drops more. While the finger was in the rectum and the child was straining, Dr. Krackowizer noticed the pallid cyanotic condition of its head and face, respiration ceased at once and the child was dead, all these phenomena—the cessation of the straining felt by the finger in the rectum, the cyanotic appearance of the head and face, and the cessation of respiration—occurring simultaneously. Death ensued doubtless partly from the chloroform and the encephalic congestion produced by it, partly from the pressure on the abdominal viscera and the impeded respiration caused by the bulky tumor. The tumor as presented is of the size of a large coconut, its external portion is evidently composed of the cortical substance of the kidney, the bulk of the mass has a tolerably soft consistence and homogeneous reddish appearance, and shows under the microscope the characteristic features of round-celled sarcoma, besides a large number of giant cells, many of them in the act of division. The weight of the tumor might be three to four pounds.

This is a unique case, at least Dr. Jacobi has not been able to discover a report of a case of sarcoma of the kidney in a child, or adult either, in all the extensive literature at his disposal. It is remarkable, that the child presented no signs of constitutional disease whatever, being well nourished, lively and talkative like most children at that age. Carcinoma of the kidney is not uncommon; Dr. Jacobi mentioned three cases occurring at 9, 4, and 2 months respectively.

#### RESUSCITATION FROM CHLOROFORM.

DR. SIMS, referring to the report in a late number of the *Lancet*, of a case of resuscitation from excessive narcosis from chloroform, which occurred during an operation for vesicovaginal fistula, performed by him in Paris, in 1861, related the case in detail and gave a very graphic and interesting account of the manner in which resuscitation was accomplished. Nélaton, whose patient the lady was, when breathing suddenly ceased, and death from chloroform was imminent, seized the patient's head, and held it downward over the side of the operating table, while another physician present took the legs

of the lady and placed them on his shoulders, thus virtually suspending the whole body in air with the head downward, and a third performed artificial respiration, by compressing the chest. After a considerable interval, the patient drew a breath, and when respiration became regular, she was again placed upon the table in a recumbent position, but at once respiration ceased again, and the same process of inversion of the body had to be repeated. As soon as respiration became regular, she was again placed on the table, and respiration again ceased; the inverted position and artificial respiration were then again employed and persisted in until the lady became conscious and asked why she was held in this position; no further relapse occurred, and the operation was concluded without chloroform.

Dr. Sims thinks that syncope during the administration of chloroform is caused by anæmia of the brain, for it is by no means the rule to see patients become cyanotic in the face, but generally pallid, and the inversion of the body by filling the brain with blood overcomes the syncope. During the past year he witnessed a second case in the Woman's Hospital, where ether and chloroform mixed were given, syncope occurred, and inversion with artificial respiration resuscitated the patient. Dr. Schuppert, of New Orleans, lately reported three cases which he revived in a similar manner, and the method employed in these five cases is certainly worthy of attention and imitation.

#### TOLERANCE OF CHLOROFORM IN LABOR.

Dr. SKENE said that he, in common with all observers, had noticed the remarkable tolerance of chloroform in labor, and also that this tolerance is less great before the actual pain of labor is present. He thinks, therefore, that this tolerance is akin to that witnessed during the administration of all anæsthetics and narcotics during actual pain.

Dr. Lusk said that chloroform was usually considered absolutely safe during labor, but he had observed two cases which go to prove that all proper precautions should be no less observed during parturition than in surgical operations: 1. In a case of tedious labor, the child was delivered with the forceps under chloroform; the placenta was adherent and was removed, chloroform being again administered, a sudden collapse took place; the patient was resuscitated, but died in 24 hours. 2. During an operation under chloroform the woman became violent, and the house-physician who gave it, thinking no doubt, according to the prevalent opinion, that it was absolutely innocuous during labor, held the handkerchief tightly over the



patient's face, thus excluding air; sudden syncope occurred, from which the woman was revived only with great difficulty. Such cases should teach us caution in giving chloroform during labor.

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## TRANSACTIONS OF THE PHILADELPHIA OBSTETRICAL SOCIETY.

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REPORTED BY JAMES V. INGHAM, M.D., SECRETARY.

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STATED MEETING, DECEMBER 4, 1873. DR. WILLIAM GOODELL, PRESIDENT,  
IN THE CHAIR.

### CASE OF DEATH FOLLOWING THE USE OF SPONGE-TENTS.

DR. DE F. WILLARD exhibited the uterus of a woman who had died after dilatation of the cervix uteri by sponge-tents. The patient had been married for eight years, but had never become pregnant. At one time, however, she suspected pregnancy, from having a six weeks' intermission between two menstrual periods, followed by a discharge of clots.

Before marriage she was regular, but afterwards the menses were scanty and painful. After he had introduced a pessary to relieve a slight ante flexion, the menses became more profuse and less painful. Offspring being earnestly desired, he introduced a sponge-tent to dilate the cervical canal, which was very narrow. The tent slightly dilated the canal, but as it closed up again, he introduced a larger one, which dilated the canal to the size of the little finger. This gave neuralgic pains, which she bore badly, although a stout-bodied woman. On a Friday he removed this tent and introduced a smaller one. Contrary to orders the patient worked the next day (Saturday) at the sewing-machine. On Sunday morning he found her with a tender abdomen, extreme pain, fever, etc. The tent was discovered in the vagina, having slipped out of the canal.

The patient was placed upon opiates and supporting treatment, but died on the ninth day.

On post-mortem examination a small amount of serous exudation was found in the cavity of the abdomen. The parietal layer of the peritoneum was covered with lymph. An abscess

containing about an ounce and a half of pus lay on the left side of the uterus. There had been extensive inflammation of the pelvic viscera; probably, at first, peri-uterine cellulitis, and then general peritonitis.

In the discussion which ensued, Dr. Ellwood Wilson reported an analogous case. The patient was desirous of becoming pregnant; she suffered with painful menstruation from malformation of the neck of the uterus. He introduced a sponge-tent on a Thursday. Fearing insufficient dilatation, he introduced another on Saturday morning. This was left in until Sunday morning. She seemed so well that he gave her permission to go downstairs. She, however, not only did this, but in the evening went to church. In the night she had a chill—on Monday peritonitis set in—on Tuesday she died.

DR. H. LENOX HODGE also had seen a fatal case. He thought the use of tents was more dangerous than the profession believed. His case differed from the others in this particular, that the patient had been kept perfectly quiet after the introduction of the tents. The dilatation was desired by her husband, himself a physician, to facilitate the diagnosis of a suspected tumor. The first tent was introduced on Saturday, the second and third, on Sunday and Monday respectively. Before the removal of the last, she complained of acute abdominal pain, and died of peritonitis in four days after. An autopsy revealed a double ovarian tumor, with the Fallopian tube of the right side firmly adherent to the uterus.

DR. J. L. LUDLOW asked whether the danger in the use of the tents was not due to abnormal growths or to some other abnormal condition of the uterus.

DR. HODGE replied that in two of the fatal cases mentioned the uteri were healthy, with the exception of a narrowing of the canal of the cervix.

DR. McCALL remarked that a condition of perfect health does not reduce the risk. He related a case in which peritonitis followed the repeated use of the sponge-tent; the patient fortunately recovered.

DR. A. H. SMITH remarked that the only fatal case which he could attribute to the use of a tent was one complicated with a morbid growth. In this case he had once dilated the uterus successfully, and removed the tumor with an *écraseur*. The tumor recommenced to bleed eighteen months afterwards. He dilated with sponge-tents, and scraped away the tumor, which was a soft mass, probably a fibroid degenerating into a medullary sarcoma. Peritonitis set in, and the patient died in three days. He never hesitated to use tents, even in his office. The great danger was from their repeated use, when the uterus is in

such an irritable condition that septic matter is readily absorbed. He did not hesitate to use a second tent, but he feared a third. He always required his patients to use an antiseptic wash while the tents were being used. For sterility or for dysmenorrhœa he often put in a sponge-tent the day before menstruation, and kept it in throughout the flow.

DR. GOODELL had one case to record of death following the use of three sponge-tents. It was a case of intra-mural tumor, and whether the peritonitis was owing to the tents or to the manipulation with finger and sound by the five physicians present, he could not say.

He believed and thought that the history of fatal cases following the use of tents proved that it is not the first tent nor the first batch of tents passed into the cervical canal that does the mischief, but those put in at the second or third visit. The first tent irritates and congests the cervix; its removal abrades the mucous coat, and from this raw surface are absorbed the fetid discharges or septic material generated by the succeeding tents. Influenced by this opinion, he now first stretches open the canal by the uterine dilator, crowds in the largest sponge-tent possible, and then insinuates around it several small laminaria-tents. He thus tries to accomplish the necessary dilatation by one instalment of tents. The use of detergent vaginal washes during the presence of the tents he always enjoins upon his patients.

DR. J. CHESTON MORRIS stated that his experience led him to agree fully with these views. The first sponge-tent was free from danger, and so in a great measure was the second. It was the third introduction that, in his hands, had been followed by serious results.

#### UTERINE DILATORS.

DR. ELLWOOD WILSON presented to the Museum of the Society a set of four uterine dilators, which he had used with great success. They were of varying sizes: the smallest dilated the canal to a width of three-eighths of an inch; the largest to one inch. He used one at a time, at intervals of three weeks, each dilatation occupying one-half minute of time.

DR. WM. GOODELL stated that he had been using the uterine dilators with great satisfaction. He had cured several cases of dysmenorrhœa, anteflexion, and retroflexion. He expands the cervical canal to its utmost width at one visit, and uses but two dilators—one small one to tunnel out the canal, and a large one to complete the dilatation. The act of dilatation so straightens out the womb that flexions are much improved thereby. With this instrument he also keeps the cervical canal stretched open while

using intra-uterine injections. He found it invaluable for preparing the cervical canal for the reception of a stem-pessary or of sponge-tents.

#### EPITHELIAL CASTS OF THE BLADDER.

DR. J. H. HUTCHINSON presented two epithelial casts. The first was a cast passed from the vagina or the bladder of a young unmarried woman.

She had great irritability of the bladder. Casts were passed on two occasions. The second cast presented also came from a young unmarried girl. The patient had suffered from hemorrhage from the uterus, and was treated with vaginal suppositories of sulphate of iron, belladonna and opium, etc. She pulled this cast, as she alleged, from the urethra. Dr. Hutchinson asked whether these casts were common as a result of injections into the vagina and bladder.

DR. TYSON had seen a cast of the vagina from the use of an injection of persulphate of iron.

DR. GOODELL referred to the fact that complete casts of the vagina are often shed after the use of strong astringent solutions. A strong solution of the nitrate of silver was perhaps more commonly followed by this phenomenon. With regard to casts of the bladder, he had never seen one, although many cases had been reported. The two specimens presented by Dr. Hutchinson seemed to him, from their history and their appearance, to be casts of the vagina.

STATED MEETING, JANUARY 5, 1874. DR. WM. GOODELL, PRESIDENT, IN THE CHAIR.

#### APOPLECTIC PLACENTA.

DR. INGHAM exhibited a placenta with a firmly organized blood clot extending completely around it, and gave the following history of the case: Sarah F., aged 34, was admitted into Dr. Ingham's wards, for diseases of women, in the Philadelphia Hospital, on November 1st, 1873. She had miscarried about two years before, but since that time had been comparatively well, menstruating regularly until August, 1873, when her menses due on the first did not appear. This suppression lasted until the middle of October, without any special symptoms. At that time (October 12) she complained of a severe abdominal and pelvic pain, so severe that she was compelled to remain in bed for several days. Soon after the commencement of this attack she had a severe hemorrhage from the vagina, which,

however, stopped without treatment. She also stated that three days before admission to the hospital she had had another hemorrhage; but when examined carefully after her admission no traces of it could be found. She was then believed to be about four months advanced in pregnancy. From time to time after her admission she had discharges from the vagina, closely resembling in character the amniotic fluid, but free, however, from blood. On the 20th of December she had another hemorrhage, accompanied with considerable pelvic pain. The vagina was tamponed, but without avail, for the hemorrhage continued, and on the 25th she miscarried. The fetus was living, and about six months advanced in utero-gestation. The placenta came away without assistance. The entire border of the uterine surface of the placenta was occupied by a well-organized blood-clot, which was believed to date back to the October hemorrhage and illness. On lifting up the membranes this clot was found to have extended beyond the edge of the placenta, and was attached to the membranes by numerous small fibrous bands. The membranes were covered with patches of organized clots. The rest of the placenta was healthy. Dr. Ingham then stated that although he had seen a great many specimens of apoplectic placenta, he had never seen so complete a clot, and had never before seen these fibrous bands, the very existence of which indicated that there had been a considerable inflammatory action following the hemorrhage.

DR. GOODELL remarked that he had never seen so firm a clot nor so well-marked an inflammatory condition. He believed that Dr. Ingham was correct in stating that the origin of this clot was coincident with the October hemorrhage.

#### CONGENITAL DEFICIENCY.

The committee appointed to examine the case presented by Dr. Cathcart<sup>1</sup> make the following report:

The young man is in appearance a fine, healthy, able-bodied man, 24 years old, muscular and well developed in every way, except the left hand, of which there is a congenital deficiency of the anterior portion.

The carpus seems to be perfectly developed, but the remainder of the hand appears wanting. There are but two metacarpal bones, which are placed one on either side, and to each is attached, but not articulated, a rudimentary finger. That upon the radial side seems to be the last phalanx of the thumb, and evidently contains bone; that on the ulnar side contains no

<sup>1</sup> See Transactions of the Society, reported in the May number of the *American Journal of Obstetrics*, page 160.

bone. The rudimentary little finger is half an inch in length, the thumb being (three quarters)  $\frac{3}{4}$  in length; both furnished with nails. There is no voluntary motion in either of these fingers.

The length of arm from the elbow to the carpus seems to be the same in both, but the right arm is very much more developed muscularly.

The pronators and supinators are all present, so are also the flexors and extensors.

The tendons of flex. carp. rad., flex. sublimis dig., palm. long. and flex. carp. ulnaris, are all distinguishable.

The muscles of the ball of the thumb, and of the little finger are somewhat developed, but without power.

The metacarpal bone of the thumb is apparently present, and to it is attached the flex. carp. rad. Posteriorly this metacarpal bone articulates apparently with a bone situated nearly in the position of the os magnum; the trapezium and trapezoid being either absent or else fused with the metacarpal bones. The other carpal bones are all present. The fifth metacarpal bone is also present. The second, third, and fourth are wanting. The styloid processes on either side are normal.

It is the opinion of the committee that it is a case of deficiency of development, and that the projections are a rudimentary little finger and thumb.

JOHN H. PACKARD, M.D.

DEFOREST WILLARD, M.D.

J. H. CATHCART, M.D.

DR. WM. GOODELL, the retiring President, then delivered the annual address.

The following gentlemen were then elected officers for 1874:

*President*—Dr. Albert H. Smith.

*Vice-Presidents*—Dr. John L. Ludlow, Dr. John S. Parry.

*Secretary*—Dr. James V. Ingham.

*Treasurer*—Dr. D. Murray Cheston.

*Curator*—Dr. Wm. F. Jenks.

*Publication Committee*—Dr. W. Goodell, Dr. W. F. Jenks, Dr. J. H. Packard, Dr. R. G. Curtin.

*Council*—Dr. Lewis D. Harlow, Dr. Robert P. Harris, Dr. James F. Wilson, Dr. Ellwood Wilson.

The following gentlemen were then elected Honorary, Corresponding, and Associate Members.<sup>1</sup>

<sup>1</sup> Extract from the Constitution, Art. XI.

SEC. 2. The Associate Members shall consist of practitioners of medicine residing in the State of Pennsylvania, but not in the city of Philadelphia, who

*Corresponding*—Drs. Fordyce Barker, T. G. Thomas, J. Marion Sims, T. A. Emmet, E. R. Peaslee, Nathan Bozeman, Isaac E. Taylor, Abraham Jacobi, of New York; J. V. P. Quakenbush, of Albany; Charles Buckingham, of Boston; Wm. H. Byford, of Chicago; Theophilus Parvin, of Indianapolis.

*Honorary*—Drs. Robert Barnes, J. Braxton Hicks, of London; Alfred H. McClintock, of Dublin; J. Matthews Duncan, of Edinburgh; C. G. Fabbri, of Bologna; Carl Schroeder, of Erlangen.

*Associate*—Drs. Hiram Corson, of Conshohocken; Jacob Price, of West Chester; Trail Green, of Easton.

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## QUARTERLY REPORT ON OBSTETRICS AND DISEASES OF WOMEN AND CHILDREN.

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THE USE OF ERGOT IN GYNÆCOLOGICO-OBSTETRICAL PRACTICE.

By DR. JOHN DENHAM (*Dubl. Jour.*, lv. p. 336) and DR. A. WERNICH (*Med. Centr. Bl.* XI. 23, 1873; *Schmidt's Jahrbücher*.)

DENHAM, who has previously proved that ergot exerts no poisonous, but only a mechanical, influence on the child, has seen no favorable effect from it as an *emmenagogue*. In *leucorrhœa* the remedy repeatedly did good service when given in small, frequently repeated doses; iron with good diet and astringent injections, however, was more beneficial. In hemorrhage, occurring several days or weeks after confinement, where the uterus is softer and more voluminous than normal, ergot is indicated. It is of equal utility when the hemorrhage is caused by polypus, the expulsion of which it appears materially to assist, but it should not be recommended in the flooding accom-

will by their active co-operation, further the objects of this Society. They shall be entitled to all the privileges of the Society but that of voting, and on the payment of \$2 per annum shall receive the Society's Transactions.

SEC. 3. The Corresponding Members shall not exceed twenty in number. They shall consist of residents of the United States of America, but not of the State of Pennsylvania, who are distinguished either as authors, teachers, or practitioners of obstetrics, or of the diseases of women and children.

SEC. 4. The Honorary Members shall not exceed twelve in number, and shall be chosen from distinguished foreign practitioners of obstetrics, or of diseases of women and children.

panying fibroid tumors. If ergot is given during the period from the sixth to the ninth month of *pregnancy*, it exerts no injurious influence either on the life of the mother or the child, and is unable to bring about labor before the normal term of pregnancy. The author doubts decidedly that ergot can produce *miscarriage* in healthy women, although it will terminate the abortion rapidly, if it have already commenced. In the *placental stage of labor*, immediately after the birth of the child, the agent has not realized the expectations held of it, neither before nor after the expulsion of the placenta: not before, because it induces a condition of the uterus which is very prejudicial to the introduction of the hand, should this become necessary; not after the removal of the placenta, because it depresses the circulation and the nervous system, because it often produces nausea and vomiting, and particularly because it has no specific power over the uterus when emptied of its contents; besides, we possess much more reliable means, such as the constant pressure of the hand on the uterus, cold water externally and as injection. Where we have reason to anticipate hemorrhage in the post-partum stage, it is, however, advisable to give ergot towards the end of the second stage of labor.

In *t tedious labors*, caused by insufficient uterine contractions, Denham now uses ergot more rarely than formerly, but applies the forceps instead, and has gained much more favorable results both for mother and child.

If ergot is given to hasten labor and the latter still remains protracted, the child is in great danger, not so much from the toxical effects of the drug, as because the violent and incessant contractions of the uterus induced by it mechanically disturb the circulation.

Denham finally calls attention to the repeated favorable employment of ergot of late in hemorrhage from other organs, and in aneurism.

In the discussion on Denham's opinions, which took place in the Dublin Obstetrical Society, Johnston coincides in the view, that ergot is poisonous neither to the mother nor to the child. He also uses the forceps more frequently now, where formerly he gave ergot; and, indeed, uses the latter only where it is desirable to call forth active contractions, as in cases where chloroform is to be used.

Ringland does not wish to see ergot entirely discarded in the post-partum period, but recommends that it be used together with other measures, cold, injections, etc. He cannot agree with Denham, that it exerts no influence on the uterus from the sixth to the ninth month of gestation if contractions have not already commenced. After an injection of four grains of er-



gotine he lately saw uterine contractions arise, following nausea and vomiting.

Byrne would use ergot in the second labor-stage only when the head of the child is in a position where it can be extracted at any moment with the forceps.

At a later meeting of the same Society, Dr. Thomas Moore Madden gave the following indications for the use of ergot: 1. Immediately before the narcotization of a woman who is to be delivered by the forceps, in order to insure subsequent active uterine contractions; 2. With multigravidae, where post-partum hemorrhage is anticipated; 3. In lesser hemorrhage after labor. The best preparation is the fresh powder in doses up to half a drachm in warm water; Long's tincture is also a good formula.

Atthill considers the remedy to be either dangerous or ineffectual; if it causes contractions of the uterus it at the same time also endangers the child. He gives it only where hemorrhage appears imminent, and entirely discards it after labor. When he gives it he adds to each dose a few drops of the Tr. sem. strychnos, and thinks that its efficacy is increased thereby.

Kidd made the observation that in post-partum hemorrhage when vomiting occurs the pulse sinks, the hemorrhage ceases, and a general improvement ensues; ergot does not, however, cause uterine contractions at this time. Before the birth of the child he has never given ergot but once, and then successfully, when the object was by means of a few strong pains to complete the expulsion of the head, which already stood in the vulva. Would not ipecac, by inducing vomiting in the post-partum period, do the same service as ergot? We should well consider the words of Barnes, that with ergot we produce an effect which we are not able to control.

A. Ringland has used ergotine hypodermically in sixteen cases, and only once unsuccessfully in an unmarried woman twenty-eight years of age; in the other cases, always in the post-partum stage, after sixteen seconds to two minutes vomiting set in, which, however, never became alarmingly violent; as a rule, three to four grains, never more than six, were used.

McClintock calls attention to the importance of the experience made by others as well as Denham, that ergot does not threaten the life of the child as a poison, but by producing violent uterine contractions. He always gives the tincture; he has frequently tried it as an emmenagogue, but always unsuccessfully. In uterine fibroids it is also ineffectual, as already mentioned by Denham, who finally remarks, that its favorable action in post-partum hemorrhage does not depend on the vomiting it induces, but on the reduction of the heart's action,

and consequently on the moderation of the circulation from which the flooding is sustained, whereby time is gained to allow of the formation of coagula.

Dr. Wernich, of Berlin, directs attention to the importance for obstetrical practice of the condition of the *urinary bladder* after the use of ergot.

Numerous observations confirm the fact that the characteristic fulness of the bladder in ergotism is not accidental, but a necessary consequence. An irritant influence of ergotine on the sphincter vesicae has not only been generally admitted, but also employed in therapeutics; for instance, in paralysis of the sphincter after typhoid fever, in nocturnal incontinence of urine in children, and those cases of incontinence in old people which depend on single weakness of the sphincter, in paraplegia, etc. In his experiments on animals the author had emptied the bladder for the purpose of permitting the more convenient observation of the uterus, but found it again enormously distended shortly after the introduction of ergotine into the system; this appears to prove that there is another circumstance here besides spasm of the sphincter. The extreme distention of the urinary bladder does not depend alone on a retention of the normal amount of urine, but also on a simultaneous increase of the urinary excretion produced by the drug.

The obstetrical experience which induced the author to attribute a practical importance to the above observations is, in short, the following:

1. Multipara with twins; complete cessation of the pains during eight hours, the os being completely dilated; easy extraction of the first child, thereupon spontaneous emptying of the bladder. Ergot, 0.5 grammes=10 grains every half hour; violent pains, the uterus closely grasps the child while the os remains open, the head does not advance. The bladder is enormously distended; after it is emptied a moderate pain causes the head to descend, after four more pains the child is born.

2. Primipara, head in vertex presentation deep in the pelvis, cessation of pains for several hours, urinary bladder completely empty; ergot; after the second dose painful contractions, which in two hours do not advance the head in the least. The bladder is found very full, is emptied, and the head immediately descends.

Herefrom is to be deduced the necessity of carefully watching the urinary bladder after the administration of ergot, and of catheterizing if necessary. It is highly probable that in the majority of cases in which the use of ergot is not followed by expulsive efforts, not the poor quality of the article or an

incorrect indication, but a mechanical obstacle to delivery only just produced by the filling of the urinary bladder, is to be considered the cause.

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ON THE CHANGES IN WEIGHT OF FULL-GROWN NEW-BORN INFANTS. By DR. THOMAS KÉZMÁRSKY. (*Arch. f. Gynäkologie*, V. 3, 1873. *Schmidt's Jahrbücher*.)

DURING the years 1871 and 1872 the author has made two series of observations. The children of one series were weighed immediately after birth and afterwards daily once at the same hour; the children of the second series after the first weighing daily twice, in the morning between 8 and 9, and in the evening between 6 and 7 o'clock. The weighing was done by the author himself on an accurate pair of decimal scales, the children having previously been undressed. Only completely full-grown, healthy children, which were nursed by healthy mothers, were included in these experiments. Of those weighed once a day there were 41, of those weighed twice a day, 32; together, 73 full-grown new-born infants.

The average weight of each of the 73 children was 3329.8 grammes; the average length, 50.067 centimetres. The average weight of a boy—there were 34 boys and 39 girls—was 3382.8 grammes; that of a girl, 3283.7 grammes; making a difference of 99.1 grammes. The average length of a boy was 50.298 centimetres; that of a girl 49.866 centimetres: a difference of 0.432 centimetres.

From his investigations the author deduces the following results: 1. All children lose weight during the first days after birth. 2. The loss commences already during the first hours after birth, but may not unfrequently be temporarily equalized by an abundant supply of nourishment during the first hours, before the intestine and the bladder have been emptied; exceptionally this loss may be changed into a slight increase of weight, which however hardly lasts beyond the sixth hour. 3. The increase generally commences on the second and third day. 4. The decrease is much more sudden than the increase, so that up to the seventh day, hardly a little more than half of the loss has been supplied. 5. There is no causal connection between the commencement of the increase and the separation of the stump of the cord. 6. Boys, on an average, begin to increase sooner, probably suffer less loss, and show a greater gain than girls; a larger number of the former also reach their original weight in the same time. 7. The children of multiparæ show a more favorable proportion of growth than those of primiparæ.

As a rule, heavy boys show a more favorable proportion of growth than light girls, and the secondary increase with the former is relatively considerable. The influence exerted by the original body-weight on the fluctuations of weight is demonstrated by the author from the children of the first series which weighed under 3,360 grammes, and from those which weighed more. Thus, of 16 light children up to the 7th day, 4 (25 per cent.), of 16 heavy children, 7 (43.7 per cent.), reached or surpassed their original weight. The reason, according to the author, why heavy children thrive better, is that these children learn to nurse more rapidly, and are able to nurse more vigorously; further, that they descend from healthy mothers who can give them plenty of nourishment. The author therefore coincides with the practical advice given by Kehrer: 1. Early application of the child to the breast; 2. better nutrition of the mothers during the later months of gestation.

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THE POSSIBILITY OF INFECTION BY HEREDITARY SYPHILIS. By DR. CARL GÜNZBURG. (*Österr. Jahrb. f. Pädiatrik.*, II. p. 160. *Schmidt's Jahrb.*)

THE mortality of children with congenital syphilis now amounts to between 72 and 78 per cent. In the Foundling Asylum at Moscow, under 1,000 children admitted annually, 200 are syphilitic; the importance of the above question is therefore apparent. Hueter, Ricord (experiments with inoculation), v. Bärensprung, have decided *against*, Cullerier, Vidal de Cassis, Simon, as positively *for*, the contagiosity.

The material of observation was 31 wet nurses from the Moscow Foundling Asylum, who, themselves healthy, each nursed  $\frac{1}{2}$  to 2 years, together 395 $\frac{1}{2}$  months, 120 syphilitic children. Although the children were affected with syphilitic disease of all kinds, also in the mouth, not a single nurse became syphilitic. The errors of other authors G. attributes to the fact, that not uncommonly healthy children are infected by a nurse with latent *constitutional* syphilis and occasional erosions of the nipples, &c. These children now acquire *constitutional* syphilis, and can therefore infect others.

G. says that in those cases which were intended to prove the transmissibility of congenital syphilis, the possibility of a previous direct infection of the child was never excluded. A statement by Dr. Richard Förster, in Dresden, is mentioned, according to which of 30 new-born children which were nursed, 4=13 $\frac{1}{3}$  per cent., of 36 syphilitic children six months of age, which were nursed, 6=16 $\frac{2}{3}$  per cent.; of 13 new-born infants

artificially nourished,  $10=76\frac{1}{3}$  per cent.; of 18 similar children six months of age,  $13=72\frac{2}{3}$  per cent. died.

A mortality-table of syphilitic children from the Moscow Asylum is added, which shows that the mortality of new-born infants during the years when most of them were nursed, was 63 to 67 per cent.; during other years, however, 69 to 80 per cent. In the year 1871 the above proportion was 54 to 90 per cent.

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A NEW TREATMENT FOR GASTRALGIA IN NERVOUS WOMEN. By JOULIN. (*Gaz. des Hôp.* 72, 1873. *Schmidt's Jahrb.*)

In severe cases of gastralgia J. applies ice and counter-irritation to the skin. 1. Ice-compress to the epigastrium for ten minutes morning and evening. 2. Immediately after the ice and on the same spot sinapisms as long as possible. 3. Ice pounded to snow, a tablespoonful every five minutes for one hour morning and evening. 4. Mustard baths three times a week (750 to 1000 grammes of mustard-meal to an ordinary bath). A nervous cough is no counter-indication to this treatment. The efficacy of the mustard-plasters is not diminished by the anæsthesia produced by the previously applied ice-compresses. The treatment is to be continued for some time, even after improvement, and is particularly applicable in the vomiting of pregnancy.

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ON GLYCOSURIA IN PARTURIENT WOMEN. By DE SINETY. (*Gaz. Méd. de Paris*, 1873; *Chir. Med. Rundschau*.)

BLot stated that the urine of nursing and of many pregnant women contains sugar. This statement was entirely denied by some (Leconte, Wiedershold, Riedel) and only partially admitted by others (Kirschlen, Brücke, Iwanoff, Lecocq, Chailley, Louvet).

De Sinety thinks he can remove the discrepancy in these statements by his observations.

In all cases, in which from any reason the emptying of the lacteal glands is hindered, sugar is said to appear in the urine. When, however, the production and consumption of milk are proportionate, the sugar disappears from the urine. During the first two days he always found sugar, which he detected by Brücke's method (with Iwanoff's modification); also by Fehling's, Böttger's, the fermentation and polarization tests. During this time the child is not able to consume the superfluous milk. On all urine of pregnant women which contains sugar a layer of fat globules forms, which dissolves in acetic acid and becomes brown in osmic acid.

The series of fourteen cases in pregnant women is completed by observations on three sluts and two female rabbits, in which the author could produce glycosuria at will by merely removing the young from their dams. As proof of his assertion, that the suppression of milk increases the amount of sugar in the blood, he adduces only one case (experiment on a slut) in which the amount of sugar in the blood of the carotid artery rose from 1.1 to 2.9 per cent.

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THE ARTIFICIAL SEPARATION OF THE PLACENTA WITHIN THE MEMBRANES. By DR. O. KÜHNE. (*Inaug. Diss., Königsberg, 1873; Centralbl. 1873, 38. Ibid.*)

THE author reports a new method of detaching adherent placenta employed by Hildebrandt. It is as follows: Instead of passing the hand along the inner wall of the uterus outside of the membranes, it is introduced inside of the latter along the umbilical cord, and, as soon as it reaches the border of the placenta, it pushes the membranes before it, becoming enveloped by them like a glove, and thus carefully advances between the uterine wall and the parietal surface of the placenta until all adhesions are divided. The results obtained in this manner are so favorable, as to insure the hearty recommendation of the new method.

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ON THE AMPUTATION OF THE VAGINAL PORTION OF THE UTERUS. By PROF. OTTO SPIEGELBERG. (*Arch. f. Gyn. V. 3, 1873. Ibid.*)

IN a series of fifty-three operations, to which he adds seven reported by Langer, the author has sifted all the usual methods of operation and obtained the following result. The indications were: Carcinoma, 22; inflammatory hyperplasia, 7; sterility, caused by conoidal cervix, 5; snout and wing shaped cervix, 10; circular hypertrophy in prolapsus, 10 times; in all, sixty cases. The method of operating was: Amputation with the knife without sutures, 8; with simple sutures (Sims), 6; with hemming of each lip (Simon), 3; with the écraseur, 4; and with the galvanic cauterium loop, 39 times; 5 cases out of sixty terminated fatally—once because the peritoneal cavity was opened in carcinoma, once from peritonitis and secondary hemorrhage in carcinoma, once from shock in hyperplasia, once from secondary hemorrhage and pelvic cellulitis in carcinoma, and once from septicæmia in polypoid elongation. The last case should be excluded, because the patient was ill before with erysipelas.

The peritoneum was thrice injured: once with fatal result, and twice with recovery without reaction. The peritonitis, which terminated fatally, is to be attributed to the stretching of serous folds and possible adhesions. In all four cases the peritoneum was injured less by instruments than by the traction on the uterus.

*The first condition for a safe amputation is, therefore, the avoidance of any forcible downward traction on the uterus, the operation in the natural position of the parts (absolute avoidance in carcinoma).*

Hemorrhages were always profuse in the operations with the knife and scissors, particularly in carcinoma. A ligature is but rarely possible; almost always impossible when the seat of operation is at the fornix vaginae, as in cancer. As a styptic, the red-hot iron is not a prompt remedy, as little as the tampon, which, by speedy decomposition, as well as the soon necessary renewal of the tampon, is easily followed by hemorrhage. Therefore, it is best, after the bloody operation, to cover the wound with mucous membrane, which, however, can be done only where the cervix stands low enough, or can easily be drawn down.

*In cases where the cervix does not stand low or cannot be drawn down without danger, the bloody operation (knife or scissors) should not be employed.*

For the bloodless amputation are used the *écraseur* and the galvanic loop. The *écraseur* is known to be a dangerous instrument, because it easily injures the neighboring organs; if it is used, the precautions already advised by Simon (protecting needles, etc.) are to be employed.

An advantage of the *écraseur* is, that the wound heals in a shorter time and with less suppuration than after galvanic cantery, which, however, is less painful, an equally good preventive against hemorrhage, easily applicable when the uterus is fixed, and therefore less liable to injure the peritoneum.

*S. therefore recommends only two methods: amputation with the knife and closure of the edges of the wound with sutures, and removal by the galvanic-cautery loop.* The galvanic loop will do for any case, the bloody operation only for a certain number. In carcinoma, S. only allows the operation with the galvanic-cautery loop. Here palliative applications are also made by S. only with the loop; he no longer uses the knife or the curette. In prolapses of the uterus and vagina the operation is only a part of the radical cure, in cases where there is no primary elongation of the vaginal portion. It diminishes the size of the uterus, however, and the subsequent wasting lightens it. The conoid amputation after Huguier is not recom-

mended. In simple elongation of the cervix, as also in snout-shaped, polypoid, and conoid configuration, the bloody operation is preferable, because the amputation is easy and the stump can be covered with mucous membrane.

The author recommends the amputation in hyperplasia of the cervix without elongation (chronic metritis). These are the cases in which Lisfranc achieved his best results. Here S. also prefers the cantery loop because it is difficult to draw the uterus down, and the subsequent suppuration seems to aid the involution of the uterus. S. does not recommend the knee-elbow or lateral position for the operation; he uses exclusively the position on the back with elevated pelvis. (His case of death from shock, as well as the one caused by laceration of the peritoneum, occurred in the knee-elbow position.) An advantage of the dorsal position is the possibility of administering chloroform. (Can be administered with equal safety and facility in the abdomino-lateral position (Sims's) commonly employed in this country. Ed.) Where the cervix is not visible it must be brought into view by the application of Simon's plates or long or broad levers. It is advisable to introduce the catheter in order to ascertain the point to which the bladder descends. If the knife is used, the cervix uteri is seized with a tenaculum above the point of incision and the vaginal portion below removed; the knife being carried around it as around a limb to be amputated, in order to give as smooth a surface as possible. The sutures may be applied in two ways. The simple covering of the stump with mucous membrane according to Sims, is the easier procedure, but is liable to lead to atresia. The hemming of the lips (Hegar, Simon) is more difficult, but more advisable, because it is not followed by atresia. In this operation two sutures (one to the right and one to the left) are first applied to unite the vaginal mucous membrane, and then the middle portion of the vaginal mucous membrane united with the borders of the cervical mucous membrane by 3 or 4 stitches. These sutures must be laid deeply, because the cervical mucous membrane is immovable, and easily tears through. For the galvano-caustic operation S. of late uses iron wire; he seizes the lips of the cervix with the double tenaculum and pushes the wire loop over it—at times a somewhat difficult proceeding. Then he draws together the loop, which is heated to a red heat only at first, in order to cut through the mucous membrane quickly. When this is done the loop is buried in the furrow, and all instruments for dilatation, even the tenaculum, may be removed. The division of the cervix must be slow and more by heat than active constriction, but the wire must not be too hot, or else the operation does not guard against hemorrhage. If the patient complains of

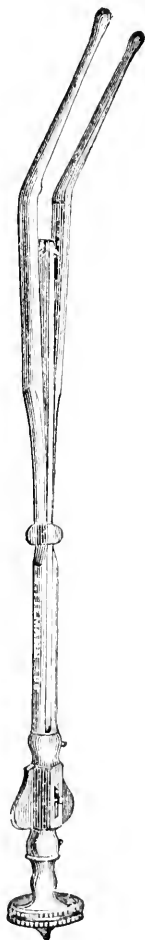


the heat from the wire, the vagina may be cooled by irrigation. The reaction after the operation is slight. The slough begins to separate on the third, and has generally fallen off by the tenth day, when secondary hemorrhage will occasionally occur, which requires the tampon. A particular treatment is not necessary; cicatrization is accelerated by superficial canterization. After the galvano-caustic amputation, constriction, even atresia, may ensue, and dysmenorrhœal symptoms will therefore require further treatment.

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A NEW UTERINE DILATOR. By CHARLES MILLER, M.D., *New York*.<sup>1</sup>

DILATATION of the uterine canal has been considered for many years past an important means of diagnosis and treatment of intra-uterine diseases. For this purpose sponge-tents and laminaria have been principally employed, and in many cases with advantage; but they have also disadvantages which are too well known to every gynecologist, to be mentioned here. Instruments have occasionally been devised and constructed; but so far, not one has fully answered the purpose. For instance, Dr. Priestly's instrument dilates the os externum, while the os internum is scarcely affected by it. Other instruments have been employed with the opposite effect, *i.e.*, the uterine canal was being dilated more at the internal than at the external os. Solid metallic dilators frequently offer disadvantages which are not always easily overcome; for instance, in cases of great mobility of the uterus, the latter will invariably recede, and though a tenaculum may be resorted to, to fix the organ, that procedure is often very painful to the patient. Besides this, more than one, in some cases even four or five different sizes are obliged to be used to produce a sufficient



<sup>1</sup> This article was unfortunately received too late for publication among the "*Original Communications*," where it properly belongs. For the sake of comparison with the other uterine dilators described in this number, we have preferred, with the author's consent, to insert it here rather than to leave it over till the next number. We have examined the instrument, and think it in some respects superior even to Dr. Palmer's, reported on p. 311 of this number.—Ed.

dilation, which requires much time and greatly annoys the patient.

The great desideratum always seemed to me an instrument which would dilate the uterine canal equally from the os externum to the os internum, with less inconvenience to the patient, and less loss of time to the physician.

About three years ago I had an instrument constructed of steel, and shaped somewhat like a pair of plain forceps, the shanks being straight, rounded off on the outside and flat inside; about three inches long, closing at the end, and being about a quarter of an inch apart near the joint. This seemed to answer the purpose, but I soon found that in cases of flexion or version I had to use the sound first, to enable the dilator to enter, and therefore had the same bent near the joint at an angle of 65 degrees. This I have used until about six months ago, when I devised a new instrument, which, in my opinion, possesses all that is required of a uterine dilator, and which physicians who frequently treat uterine diseases will have to employ only a few times to appreciate its value.

It is as easily manipulated as a Simpson's sound, worked by a regulating screw, and capable of dilating the uterine canal parallelly to the extent of half an inch. It can remain in the uterus while a speculum is introduced, thus allowing ocular examination of the canal to a certain extent, and greatly facilitating local application by means of cotton or the syringe.

A regulating slide is also attached to the shanks of the instrument, which has to be pushed forward in case the parenchyma of the uterus is rather unyielding, and *vice versa* when the latter is in a softer condition.

The accompanying wood-cut shows the instrument about one-half its real size.

#### ON THE USE OF QUININE AND ERGOT IN OBSTETRICAL PRACTICE.

By DR. ANT. GUELMI, of Pavia. (*Giorn. d' Ostet. e Ginecol.*, I. 1873. *Schmidt's Jahrb.*)

This paper was called forth by Monteverdi's well-known article on the use of the preparations of quinia in obstetrics. Guelmi is entirely correct in endeavoring from his own observations to depress the too high anticipations of the oxytocic power of quinine entertained by obstetricians.

In opposition to those physicians who allege to have seen miscarriage brought on in pregnant women to whom quinia was given for dropsy or typhoid fever, Guelmi adduces nine

cases in which either for intermittent fever or various forms of neuralgia and once for inefficient pains in a commencing premature labor in the 9th month, he gave quinine in 4 doses, one every half hour, altogether 1.0 to 1.20 grammes. In several cases general quinine-symptoms appeared, but in none did pains set in during pregnancy or did the pains already present become intensified; on the contrary, *the pains in the above-mentioned premature delivery ceased entirely for three days after the administration of quinine.* Others have also observed that a threatening miscarriage during a paroxysm of intermittent fever was averted by the prudent exhibition of quinine.

Like any other excitant (wine, coffee, cinnamon), quinine may exert an influence on the uterus when already active *in generally weak persons or those possessing only a weak uterus.* Guelmi does not hesitate to use quinine in moderate hemorrhage during pregnancy or labor, because it also proves efficacious in more violent hemorrhage during menstruation, and regulates the too frequent return of the flow; but in actual danger, or where vigorous pains and a rapid delivery are necessary, quinine generally proves a failure and is inferior to ergot. Chiarleoni, in Milan, even denies the antitoxic influence of quinine in puerperal fever.<sup>1</sup>

In Germany, also, ergot is preferred to quinine as a remedy against *atony of the uterus after labor*, and the danger of puerperal infection arising therefrom, especially as the anti-phlogistic action of ergot is becoming more appreciated. G. states that ten to twelve minutes elapse before ergot acts on the smooth, muscular fibres of the uterus and its vessels, and then discusses more at length the well-known indications for the administration of ergot.

The author then considers the value of the remedies which are recommended as styptics after delivery. Among other well-known agents electricity is mentioned as an immediate remedy.<sup>2</sup>

As a prophylactic, ergot is effectual not only in puerperal processes, but also in placenta prævia, where it is given before

<sup>1</sup> Hennig, in reviewing this article, says: Doses of 1.5 grammes=25 grains, repeated 4 times every half-hour, as given by G. in one case, are much too large, and probably paralyze the uterus; whereas, from doses of 0.05 to 0.1 grammes=1 to 2 grains, H. has seen good results.

<sup>2</sup> Hennig has used electricity with great success in a most obstinate and dangerous hemorrhage after miscarriage. Guelmi does not mention the occasionally effectual application in desperate cases of the nitrate of silver to the bleeding uterine cavity, either in substance or in concentrated (at first tepid) solution.

the end of the stage of expulsion or extraction more correctly still than shortly after delivery (Seyfert). G., in addition, mentions the favorable experience of Dr. Rovescala with hypodermic injections of ergot against uterine hemorrhage.

The injections into the uterus of the tincture of the chloride of iron in suitable dilution, which are highly spoken of by G., are, however, disagreeable, in that they cause generally very tenacious coagula, which cling obstinately to the mucous membrane and are liable to cause very severe after-pains. The statement of Hervieux, that all post-partum hemorrhage is already a sign of puerperal infection, G. correctly declares to be unfounded. He calls attention to the danger of hemorrhage the first two weeks after delivery; it is explained by the fact communicated by Joulin, that the endometra, which loses its epithelium shortly after delivery, does not become completely recoated until about the 25th day.

THE ANATOMICAL PROOF OF THE PERSISTENCE OF THE CERVICAL CANAL DURING PREGNANCY. By DR. P. MÜLLER, of Würzburg. (*Verhandl. der phys.-med. Ges.*, in Würzburg. Bd. 5. 1873.)

A WOMAN near the end of pregnancy was found at night in an out-of-the-way place; she had lost much blood, and died soon after reaching the hospital. The body was taken to the medical college; the uterus and external genital organs were carefully removed. In this specimen was plainly seen what has already been demonstrated in Braune's sections of frozen bodies of women in the last months of pregnancy, and is admitted by many modern authors, namely, that the cervical canal remains preserved until the last month of pregnancy, and does not become merged in the cavity of the uterus. M. reminds us that in confirmation of this opinion, the genital organs of a pregnant woman, upon whom Cesarean section has been performed after death, cannot be used, because in such a case, after the removal of the fœtus by the operation, the cervical canal is restored by the tonicities of the uterine muscles.

The second interesting circumstance in the case reported by M., is the copious hemorrhage which occurred from a laceration, two centimetres in length, between the clitoris and the urethra. Whether this injury was caused by sexual excesses or other manipulations, could not be determined.

SPONTANEOUS EXPULSION OF THE BODY OF THE UTERUS. By DR. MARTIN, of Toulouse. (*L'Union*, 79, 1873. *Schmidt's Jahrb.*)

THIS case was referred to by Aran in his "Diseases of Women," and has already been reported in Schmidt's Jahrb. (L. p. 49), but is so interesting as to warrant its repetition, "since it is probably the only case of its kind."<sup>1</sup>

Patient 35 years, one confinement in 19th year, had always been well; in 32d year noticed irregularity of menstruation and occasional uterine pain; coition painful, sometimes followed by hemorrhage. On examination in November, 1843, an extensive ulceration of the cervix was discovered, which resisted all treatment. The hemorrhage and pain became more frequent and intense; the latter had its seat principally in the right iliac fossa. In April, 1844, the hemorrhage ceased, but a violent diarrhœa supervened, and the already previously existing leucorrhœa was much increased. June 12th, while straining during defecation, the patient noticed a large mass passing from the vagina, unattended by hemorrhage. A close inspection showed this mass to be the whole body of the uterus. No vaginal examination was made at the time for fear of injury, but, when undertaken four days later, showed an empty space in place of the corpus uteri, about which the finger could be freely moved. The patient was weak, but doing well, when on June 20th a sudden and unexpected peritonitis came on, of which she died on the 23d. At the post-mortem, besides the evidence of the peritonitis, no trace of the uterus was found. The round and broad ligaments on both sides were destroyed. One ovary was hypertrophied; the other, atrophied.

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THE TACTILE UTERINE SOUFFLE. By EMIL ROTTER. (*Arch. f. Gyn.*, V. 3. 1873. *Schmidt's Jahrb.*)

THE reason why it was never discovered that the uterine souffle could be felt, notwithstanding the numerous investigations on the subject, is that this phenomenon must be sought for in order to be perceptible, and that little practical importance was attached to it. Rotter was also induced, more by theoretico-physical considerations, to prosecute his inquiries, but he hopes that they may aid in deciding the much-discussed question of the origin of the souffle. The incentive to further

<sup>1</sup> The reviewer, Sickel, in Sch. Jahrb., does not seem to have looked very carefully through the literature of the subject, else he would have found in the number for August, 1872, of this *Journal*, p. 326, a detailed report of a case by Dr. Paul F. Munde, which closely resembles the present one, and the mention of three further cases by Fordyce Barker, Mettauer, of Virginia, and Habib, of Vienna.—ED.

investigations was given R. by the examination of a woman at the middle of the tenth lunar month of pregnancy, in Prof. Schröder's clinic, July 28th, 1872. The woman was in her second pregnancy, the abdomen pretty large; the foetal heart-sounds and back were on the left side; a large part was presenting. On palpation the finger detected a distinct thrill in a circumference of 4 or 5 centimetres around the umbilicus, which thrill was similar to that felt in an aneurism, or when the faradic current is passed through the tips of the fingers. The thrill was synchronous with the maternal pulse (86 in a minute). On stronger pressure the thrill ceased, and the arterial pulse was plainly felt. With the stethoscope a loud uterine souffle was heard. The point at which the thrill was perceptible changed with the altered position of the woman.

R. thereupon made twenty-two examinations of twenty gravidæ in the University clinic at Erlangen, the results of which were controlled by two other physicians. In uteri near term the uterine souffle was felt externally and internally eleven times. One woman was unsuccessfully examined in the seventh, but successfully in the tenth month; in another woman an exploration in both the eighth and tenth months gave no result. Women near the end of gestation, and particularly those already in labor, are most suitable for these investigations. Rapin (Schweiz, Corr. Bl. 2, 1873) had already discovered the palpability of the uterine souffle. R. in addition ascertained by his experiments, which were interrupted by an endemic of erysipelas in the Hospital, that the souffle, usually perceptible only to the ear, is also externally palpable.

In order to be certain that the souffle does not come from the epigastric artery, the woman is directed to change her position; if the location of the thrill changes with the alteration in the position of the uterus, the souffle is uterine. Should it be impossible to materially alter the position of the uterus by changing the position of the woman, a correct diagnosis may be reached by considering the anatomical situation of the epigastric artery; the vibrating tract of the uterine souffle crosses the course of the artery. It may be inferred that the vibrations felt externally in the groins are derived from the first ramifications of the uterine artery at both sides of the collum uteri, because per vaginam the distinct thrill corresponding to the externally audible murmur could be felt in the uterine artery. It has long been known that the uterine souffle is most distinctly heard on both sides of the neck of the womb, and Scanzoni remarks that pressure on this spot will alter or entirely efface the souffle. The arteries in an advanced pregnant uterus are in part wider than the main trunks of these same

arteries outside of the womb, and the physical conditions are thus given for the formation of the souffle, which conditions likewise exist at the point of entrance of the arteries into the veins or sinuses. This view is confirmed by the observation that the vibrating vessel could be traced to the pulsating artery; the vibration was not changed by diminished pressure into the arterial pulse (except in one instance), but the vibration and pulsation was, on repeated examination, always found in the same spot. Rotter thinks, that the participation of the arteries in the formation of the uterine souffle would be conclusively proven only, if it were possible by slight compression of a merely pulsating cervical artery to produce a vibration perceptible to the finger, and externally an auscultable murmur.

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ON THE PATHOLOGY OF CERTAIN SO-CALLED UNILOCULAR OVARIAN CYSTS. By GEO. GRANVILLE BANTOCK, M.D., Physician to the Samaritan Free Hospital. (*Trans. London Obstetrical Society*, vol. xv. 1873.)

WHEN, at the February meeting of this Society, in 1872, I took occasion to make a few observations on the specimen of cystic tumor exhibited by Dr. Meadows, I ventured to express the hope that at a future meeting I should be able to lay before you the specimen on which I founded my remarks. Through the kindness of Mr. Spencer Wells, I have now the pleasure of placing it before you for inspection. On the occasion adverted to I took exception to the pathological explanation of his specimen offered by Dr. Meadows. In order the more fully to bring the matter before you, I may, perhaps, be allowed to recapitulate his observations. Dr. Meadows believed the specimen to be one of unilocular cyst of the ovary, and he suggested, as the probable explanation, that a Graafian follicle situated in the hilum of the organ had become the seat of cystic enlargement; leaving the remainder of the ovary healthy; and in reply to my objections he supported his views by stating that the microscopical examination of the cyst-wall had presented those structural elements which are supposed to be characteristic of disease of that organ. I shall revert to this hereafter.

Let me first draw attention to the specimen now before you. It consists of the uterus and its appendages as they were removed from the body of a patient æt. 16. On careful examination you will perceive that on the right side the ovary is healthy; and on holding up the appendages between you and the light, so as to stretch the fold of peritoneum which extends between the ovary and the Fallopian tube, that peculiar organ, the parovarium, or organ of Rosenmüller, is plainly seen. At

its outer angle, nearest the tube, you will observe a small cyst, about as large as half a field bean, evidently originating in one of the tubules of the organ. This exhibits the first stage in the process of cystic disease. On the left side the ovary is also to be found entire and healthy; and in addition we see a cyst, about as large as the ovary, occupying the same site as the smaller one on the opposite side. On this side the three inner tubules of the parovarium are distinctly visible. It is worthy of note, in passing, that in position the left ovary was completely prolapsed into the left side of the ntero-rectal space, evidently pulled down by the weight of the cyst. I may observe that the elegance of the preparation is considerably marred by the action of the spirit in which it has lain for many months, and the cyst does not show the delicate network of blood-vessels which characterized it in its recent state.

I conceive no one who saw it in its fresh state, or may even see it in its present state, will be inclined to object to its being called a non-ovarian cyst, or to doubt that it is a cyst of the parovary.

Little as is the attention which has been devoted to the healthy condition, or anatomy proper, of this body, still less is that which has been given to its morbid state. For the former, half a dozen lines, based on the researches of Kobelt, suffice, in the admirable article of Arthur Farre, in the "*Cyclopædia of Anatomy and Physiology*."<sup>1</sup> After describing its appearance to the naked eye, as viewed between the observer and light, he says: "The tubes, which contain nothing but a clear fluid, consist of fibrous membrane lined by a single layer of pale, cylindrical, epithelial cells. These tubular canals are not known to have any direct communication with the ovary." Of its morbid anatomy, he says: "So little attention has been given to the structure in its natural condition, that accurate information regarding its morbid states can hardly be looked for." The so-called hydatids (of Morgagni) are formed "of the remains of the canals of the retrograde parovarium. Within the walls of these canals is collected occasionally a considerable amount of fluid, and it is probable that this is the origin of those larger accumulations to which dropsy of the broad ligament has been applied." Dr. West, in his work on "*The Diseases of Women*," has these words in a lecture devoted to the description of the various forms of ovarian cystic disease: "The first kind of simple cyst is one which, though in the immediate vicinity of the ovary, is, strictly speaking, not connected with it; but which I may mention here because, until

<sup>1</sup> Article "Uterus and its Appendages," p. 594.



comparatively recently, its nature was misapprehended, and "erroneous conclusions, based on this misapprehension, have been applied to real ovarian cysts." He goes on to speak of those small delicate cysts, the hydatids of Morgagni, which are often found hanging by a slender pedicle from the edge of the peritoneal fold extending between the Fallopian tube and the ovary, close to the fimbriated extremity of the tube, and containing a transparent, serous, or slightly gelatinous fluid, and of those which bear the same relation to the Fallopian tube, but sessile instead of pedunculated; and he continues: "Sometimes, too, a cyst of larger size may be observed within the folds of the broad ligament situated between the ovary and the Fallopian tube, but obviously not originating in either. . . . The difference of their seat seems to be the only point of dissimilarity between them, for the wall of both is composed of a thin, structureless membrane, incapable of division into layers, often, though by no means constantly, furnished with a lining of nucleated epithelium." I shall show that this statement of incapability of division into layers is not correct in these cysts which have their origin beyond the ovary.

"The size of an egg, an apple, or an orange is the greatest magnitude to which these cysts have yet been proved to attain; and the pendent cysts very rarely indeed reach dimensions sufficient to make them recognizable during life." "A visit to any of the large museums of this metropolis will suffice to convince any one that cysts of the Wolffian bodies of size sufficient to be distinguishable during life are of very great rarity, while the same evidence will also prove that for such cysts to exceed the dimensions of an apple is rarer still. Whenever, then, a tumor is discovered in the abdomen, which has attained a greater size than that of the doubled fist, that circumstance may be taken as in itself affording almost conclusive proof that the cyst is not extra-ovarian, nor of that kind concerning which it can be foretold that its tendency will be to remain stationary rather than to increase in size." In a preceding sentence Dr. West suggests "the rupture of the delicate walls of both kinds of these growths" as their probable termination. I shall show that these views are inconsistent with known facts, as well as contrary to *à priori* reasoning.

It may not be amiss, at this point, to direct attention to the most recent researches on the anatomy of the parovarium. Dr. Banks, in his "Prize Thesis" at the University of Edinburgh, as the result of numerous dissections, arrives at the following as one of his conclusions:

"At a certain period, on the summit of the Wolffian body, a new structure forms (supra-Wolffian body), distinct and sepa-

rate from it, though apparently continuous with it; this structure is a distinct formation, and is not an altered condition of the upper tubules of the Wolffian body. In the male this forms the globus major of the epididymis, and in the female the parovarium."

Hence I use the name *parovarium* instead of *Wolffian body*, and it is a fair assumption that this peculiar body has some function to discharge during sexual activity; while it is worthy of remark that the ovarian cysts occur at the earlier rather than at the later periods of life.

Dr. Graily Hewitt, agreeing in the main with Dr. West, says: "Now and then, however, they attain a large size,"<sup>1</sup> and in confirmation of this he quotes Mr. Spencer Wells' case (No. 93), as well as one presented to this Society by Dr. Wynn Williams. The latter "was twenty-four inches in circumference." The following is Mr. Spencer Wells' description of the operation: "The cyst was tapped, easily pulled out, and was found to be rather an offshoot from the right ovary than an ovarian tumor; so much so that I consulted with Dr. Oldham (who was present at the operation) as to the propriety of removing the cyst and leaving the ovary, which it would have been easy to do. But the ovary felt hard," etc. "A cyst the size of a walnut in the left broad ligament near the ovary was laid open and emptied." Dr. Wilson Fox makes the following report on the specimen: "A large cyst about twice the size of an adult's head. The Fallopian tube, flattened out, is seen to *course along its external surface*. The fimbriae are, however, non-adherent and distinct. The ovary is found in a fold of the broad ligament, distinct from the tumor and presenting the natural appearance. It contains no cysts. The cyst is lined internally by a flattened polygonal epithelium," and so on. Dr. Fox makes no allusion to the parovarium, the site of which was evidently occupied by the cyst. I may be allowed the supposition that it was of parovarian origin. Beyond the above I find no allusion in any recent work on the subject of ovarian disease to cystic disease of the parovarium. But the records of ovariectomy yield several cases in addition to those quoted, whose description affords unmistakable evidence of similar origin; thus, Dr. Keith reports a case (No. 12), which he calls a "single cyst of the broad ligament coming off close to the uterus." And Mr. Clay, in his Appendix, quotes the following: "Cyst in the broad ligament half an inch from the left ovary, twenty-four pounds in weight. Ovary healthy and of normal size." This description leaves no doubt that it was a parovarian cyst.

<sup>1</sup> "The Diseases of Women," 2d edition, p. 584.

I have said that the literature of this subject is exceedingly meagre. Indeed, the greater number of recent authors altogether ignore this disease, even to the extent admitted by those above named. But it has gone forth, stamped with the high authority of West, that parovarian cysts never attain a greater size than that of an orange, and I cannot allow it to pass without a few words. Assuming, then, the existence of such disease as proved, not only by the specimens before you, but by previous observation, I must take exception to the argument used by West—viz., that because he has never seen a cyst larger than an orange, such a thing does not occur; for it must, I think, be allowed that if a cyst in this organ may attain the size of an orange, there is no reason, in the nature of things, why such a size as is within the capacity of the abdomen should not be attainable. In fact, the probability is altogether the other way. It is to be observed also that the specimens examined by Dr. West have probably been obtained from women dying of other diseases at a period when the tumors had not begun to make their presence felt. Had they attained a larger size the patients would have been regarded as the subjects of ovarian disease and would have been treated as such, and if removed by operation the cases would have been described as “multilocular ovarian cysts,” or “cysts of the broad ligament.” Therefore the argument is a fallacious one, and the foregoing cases furnish conclusive evidence against it.

But we arrive at this conclusion from a consideration of the relations and structure of the cysts. In the first place, holding in view the sessile variety, the cyst is situated between two layers of peritoneum and is abundantly supplied with blood-vessels, whose development keeps pace, according to natural law, with the growth of the cyst. In the second place, the cyst is not the delicate structure Dr. West would have us believe. In fact, its walls are of considerable thickness, as can be seen on cursory examination; and as it is an organized structure, deriving its contents from the secreting apparatus with which it is furnished, the cyst-wall keeps pace, in growth, with the increase of secretion, not by distention, like an India-rubber bag, but by growth of similar elements. Hence there is no limit to their dimensions, and the idea of rupture by over distention, as a rule, is utterly untenable.

I now come to the views expressed by Dr. Meadows:—1st. He suggested that the cyst might have originated at the hilum of the ovary. This is an opinion unsupported by a single reliable observation or by any known fact. In support of this statement, I quote the following description of the anatomy and structure of the ovary from the seventh edition of Quain and

Sharpey's "Anatomy," vol. ii., pp. 988-9: "Beneath the peritoneal coat, which covers it everywhere *except along its attached border*, the ovary is inclosed in a proper fibrous coat of considerable thickness, which adheres firmly to the tissue beneath, being in structural continuity with it. Towards the surface the ovarian tissue, which in this part has been distinguished as cortical, presents, especially in children, a different appearance from the deeper or medullary part, from being granular and having within it great numbers of small vesicles, the Graafian vesicles or follicles, which are *absent from the deeper part*." Such is the description given in our standard work, and it is conclusive against the view taken by Dr. Meadows.

I have quoted the description of the ovary from our standard text-book as that generally accepted, but it is right that I should notice the most recent researches on the subject. I refer to those of Professor Waldeyer, of Breslau, and Dr. Leopold, now of Leipzig. These observers deny the existence of true peritoneum covering the ovary according to the above description. They call attention to the existence of a white line, "the boundary line," bounding the ovary "along its attached border" (distinctly visible in the specimen, No. 1), across which it is impossible to obtain a layer continuous with the peritoneum of the broad ligament and the covering of the ovary. Dr. Leopold says, after having separated a portion of the peritoneum in a delicate thin layer up to the neighborhood of the hilum it will invariably, in the attempt to continue the separation towards the ovary, tear in a serrated, sharp and straight, or undulating line exactly in the place of the boundary line. Dr. Leopold has also succeeded in demonstrating under the microscope a difference between the epithelium covering the peritoneum and that on the ovarian surface, which is illustrated in the accompanying figures with their explanations attached. I may add that he admits that this demonstration can only be made in the ovary of the young subject, and that at an advanced age it is impossible to indicate these peculiarities, probably from the changes which the ovarian surface has undergone through the repeated rupture of Graafian follicles.

I assume, then, as a fact that the hilum of the ovary does not contain Graafian follicles nor the elements of cystic degeneration; and it is contrary to a physical law that a Graafian follicle should find its way through the firm fibrous tissues characteristic of that portion into the loose connective tissue between the layers of the peritoneal fold in which the parovarium lies, in the direction of greatest resistance, instead of towards the surface of the ovary. It is also, at the least, extremely improba-

ble that in conjunction with such a cyst, assuming its possible existence, the remainder of the ovary should remain healthy.

2dly. Dr. Meadows supported his views against my objections by stating that, on microscopical examination, a portion of the cyst-wall presented those elements which one would expect to find in an ovarian cyst. But we have seen that the tubules are lined by epithelial cells, and I am not aware that we have arrived at such a certain means of diagnosis as is implied in the statement.

Returning to Dr. Wilson Fox's report already read, we find the following: "No other cysts could be found in the broad ligament." From this we conclude that he regarded the one under consideration as a cyst of the broad ligament, and Mr. Wells headed his case, "Non-adherent cyst of the broad ligament, &c." From what structures, then, did this or Dr. Meadows's cyst arise if not from the parovarium? Did they originate in a lymphatic vessel, or did they arise in the connective tissue? I assume as indisputable that all cysts lined by epithelium, and, in fact, all true cysts, take their origin in some cellular or tubular structure lined by epithelium, and they constitute the only form of cystic degeneration as distinguished from oedema of the connective tissue.

The relations of these cysts will vary according to their precise seat of origin. Thus, if the cyst arise in one of the tubules near the Fallopian tube, as on the right of the specimen, it will necessarily grow towards the tube rather than the ovary, leaving a space of greater or less extent between itself and the latter, as in Mr. Wells' case (and specimen) or in Dr. Clay's case; if near the ovary it will seem to form part of that body, as on the left of the specimen, as well as in the specimen No. 2;<sup>1</sup> if in the long transverse tubule, which may be seen in the specimen extending as far as the side of the uterus, its relations will vary according to the point of origin. In parovarian cysts the Fallopian tube will usually be found lengthened out to a foot or more, as well as very much enlarged in calibre, as in the second specimen and in Mr. Wells' case. It is difficult even to conceive how the tube can be brought into such relations in the case of uncomplicated true ovarian disease. I would suggest as the probable source of these troublesome cases, as regards operation, in which the cyst separates the layers of the broad ligament and slips down by the side of the uterus, that they have originated in the transverse tubule above referred to. Of this nature would appear to be Dr. Keith's case, No. 73, which he describes as "a single cyst of the broad ligament coming off

<sup>1</sup> The specimens referred to in the paper were exhibited at the meeting.

close to the uterus." I have seen several examples of this, and have felt that we wanted an intelligible and reasonable theory for their origin; but the frequent concurrence of ovarian disease with this has so obscured the subject that accurate conclusions were barely attainable. This theory satisfactorily accounts for them, and I offer it as a suggestion to future investigators.

In accordance with the facts already given and the views enunciated, we arrive at the conclusion that all unilocular cysts in the neighborhood of the ovary, or involving it (by contact) though leaving it healthy, are of parovarian origin, and we are further driven to the conclusion, from considerations which will be adduced, that there is no such thing as true unilocular or *unifollicular* disease of the ovary, except in its earliest stage. It is true that we sometimes, though rarely, meet with an ovarian tumor consisting of one large cyst (specimen No. 3) with thick walls, having its inner surface marked by fibrous bands or a number of smaller cysts projecting from its lining membrane; but at no time could this be called true unifollicular disease. In these the whole of the ovary disappears so as to leave no trace of healthy structure. This is in accordance with what we might expect from a consideration of the anatomical characters of the organ. Assuming the disease to have its origin in a Graafian follicle (and we must remember that there are no Graafian follicles in the hilum of the ovary), we are asked to assume that only that portion of the ovarian coat which immediately overlies the imprisoned vesicle has become the seat of that hyperæmia and thickening which are believed, I may say allowed, to be the cause of its non-rupture, and to interfere with the natural course of events, while the remainder of the organ continues healthy and in functional activity. It follows from this that the true ovarian tumor, of size sufficient to be diagnosed during life, is always multiple. I believe also that the cases of so-called unilocular disease said to have been cured by the injection of iodine were not cases of true ovarian disease. Assuming them to be parovarian, we have a ready explanation of the successful results obtained in those cases in which the cysts yielded a clear limpid fluid, and which were alone regarded as suitable for this method of treatment. The remarks I have to make on the characters of the fluid of parovarian cysts will show how they correspond with these requirements.

That a deep-seated Graafian follicle undergoing cystic degeneration, and imprisoned superiorly on every side by others in a similar condition, may, by continued pressure, and the traction of healthy tissues, tending to their separation by the continu-

ally increasing follicles, force its way through the firm tissue at the hilum of the ovary, so as ultimately to gain access to the tubo-ovarian fold of peritoneum, I am not prepared to deny; but this admission does not answer the objection that in the case of multifollicular disease such a thing is impossible, or so improbable as to amount to impossibility. On the other hand, the theory of parovarian origin receives support from the preceding arguments, and is confirmed by the specimen before you, which shows a cyst originating in one of the tubules of the parovary, which, by the necessity or accident of its position, has grown towards or involved the ovary separating the layers of the peritoneal fold in which it lies imbedded.

There is another peculiarity deserving of notice which further strengthens this view arising from the anatomical characters of the structures involved. In the case of true ovarian cystic disease it will be found exceedingly difficult to remove the external coat as a distinct layer, while in the parovarian it may be removed with the greatest facility, exhibiting an abundance of loose connective tissue. Dr. West has affirmed as a characteristic of parovarian cysts that they are incapable of division into layers. Now, the cysts before you contradict this assertion in the most positive manner; for it will be seen that, in the case of specimen 1, the peritoneal coat has been separated from the cyst-wall to nearly a fourth of its extent by air which escaped between them in the attempt to inflate the sac, the point of the tube not having penetrated the sac. That incapability of division into distinct layers, and with facility, is characteristic of the multiple form of disease, I will not wait to prove. I will ask you to try the experiment on No. 3 and compare it with the other two. This is explained by the difficulty with which the ovary in its healthy state is deprived of its investing membrane. This is, in fact, impossible in an ovary which has been in functional activity for a few years, as will at once appear from the existence of the cicatrices.

When we bear in mind that the parovarium consists of a number of tortuous tubules, and that it does give rise to cystic disease, it becomes a matter of surprise that the disease of the organ should so often assume the monocystic form rather than the polycystic. That the latter does take place I believe the evidence furnished by specimen 2 will prove conclusive. For this also I am indebted to Mr. Spencer Wells. It was removed by that distinguished operator on the 14th of February, and I regret that the specimen is not complete. It presented the same peculiarity as the cyst in No. 1 in that the ovary was ad-

herent to it and perfectly healthy, containing a recently ruptured follicle, which had been cut across in dividing the pedicle. It furnished a good example of the effects of the traction exerted by a growing body connected with it, for it was drawn out into an elongated form about double its usual length. The tumor consisted of two cysts, one holding thirteen pints and the other twelve oz. six drs. of a limpid, slightly opalescent fluid, of which a chemical examination was made for me by Dr. Divers, which is appended. The part of the ovary attached to it was removed by Dr. Leopold, of Leipzig, who was then in London, without injury to either of the cysts, and the tumor still shows in its site the trabecular structure which characterizes the base of that organ.

In its recent state it very distinctly exhibited the boundary line, spoken of by Waldeyer and Leopold, separating the ovary from the cysts. The Fallopian tube courses round the outer aspect of the large cyst, and measures over a foot in length, while its diameter is so increased that at the fimbriated extremity it will admit the point of the finger. This is invariable in the case of the parovarian cysts, and is explained in this way. The cyst lying between the two layers of peritoneum, which constitute the tubo-ovarian fold, by its equal enlargement, the resistance being equal, grows towards both aspects, so that the tube crosses over the cyst for about one-half its circumference, the edge of the fold, extending between the fimbriae and ovary, affording a fixed point on the one side, and the uterine end of the tube the other. Thus the tube may be likened to an elastic band half encircling an elastic bag to which its ends are attached. As the cyst grows it must either slip past the tube on one side or carry it along with it. As a rule, a sort of compromise is effected, for the tube does not keep the middle line exactly, but usually appears more on the anterior half of the tumor. Dr. Meadows's case answers these views to the very letter.

On the other hand, the tube seldom undergoes any change in the case of the true ovarian tumor, except such as can be effected by traction on the edge of the fold, and even then it never exceeds six or eight inches in length, while it remains loosely attached in the greater number of cases.

It will be remembered that the ovarian coat is so intimately connected with the subjacent tissues, and so broken by cicatrices that it is impossible to remove it as a distinct layer, and there is no reason to assume that the diseased condition differs, in this respect, from the healthy. Now, in this instance the outer covering may be peeled off as readily as an orange is deprived of its skin, leaving a distinct sac internally with walls



of considerable thickness. This peculiarity will, I believe, be found to be a diagnostic sign of extraovarian or parovarian cysts, and it is distinctly marked in the first specimen. I have seen Mr. Wells convert a sac in this manner into two, the outer having a portion of the ovary attached.

What, then, are the characters by which we can distinguish an extraovarian or parovarian from a true ovarian cyst? I believe the following will be found trustworthy:

*Parovarian.*

Peritoneal coat easily stripped off.

Ovary usually healthy and discharging its functions.

Tumor most frequently unilocular.

Fluid limpid, opalescent.

Sp. gr. very low, never exceeding 1010.

Mucine scanty.

Colloid always absent.

Fallopian tube almost invariably attached and stretched to several times its normal length.

*Ovarian.*

Peritoneal coat cannot be stripped off.

Ovary always diseased, and not discharging its functions.

Tumor always multilocular.

Fluid viscid, greenish, or brownish.

Sp. gr. always exceeding 1010.

Mucine abundant.

Colloid most frequently present.

Fallopian tube most frequently separate, seldom increased in length, and never exceeding six or eight inches.

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A NEW FORM OF UTERINE DILATOR. With Remarks upon its Uses. By C. D. PALMER, M.D., Cincinnati. (*Clinic*, May 16, 1874.)

THE means at the command of the gynecian to produce dilatation of the cervical uterine canal are numerous and varied. At least five different means are at hand. These are tents of various kinds, mostly of sponge and sea-tangle; dilators of rubber inflated with air or water; dilators of metal, after the manner of bougies, as Kaumnerer's or Peaslee's; dilators of metal after the fashion of Priestly, Atlee, or Nott; and finally certain cutting instruments, called metrotomes, as Simpson's, Greenhalgh's, Sims's, and Küchenmeister's, or scissors of Barnes.

Now any or all of these means may be employed either for the purpose of diagnosis or treatment. Each would appear and does have a peculiar range of application and special field of utility.

It is the desire and intention of the author to present to the attention of the profession a new form of metallic uterine dilator.

In the *Archiv für Gynäkologie*, v. 2, 1873, Dr. Ellinger, Stuttgart, presented an article showing the value of cervical dilatation with an instrument of his own invention. On a pre-

sentation of the diagram of this instrument to Mr. Max Woher, the skilful surgical instrument-maker of this city, he kindly at once made one. It has occurred to the author that this instrument was open to several objections. The blades, 2 inches long, are so arranged that by a peculiar mechanism they are separated in parallel lines. What thus appears to be a parallel dilatation from os internum to os externum is really not such, in that the blades being somewhat thin, necessarily so, yield most at the point of greatest resistance, which is at the internal os. Practically, there is then produced a wedge-shaped dilatation, the apex of which is above and the base below. With a complicated mechanism, the handle of the instrument consumes no small amount of room if manipulation is carried on through the speculum. Moreover, the expansion of the blades is effected solely with the hand of the operator, and must be more or less musteady, irregular, and uncertain.

Atlee's and Nott's instruments, simple and cheap, are open to the last-mentioned objection.

In fine, any mechanism performed purely with the hand is similarly defective.

Receiving several valuable suggestions from Mr. Woher, I have finally settled upon the following instrument: Whole length of instrument, 12 in.; blades, 2 in. long; curved as the uterine sound to facilitate introduction; provided with projecting shoulders at this distance from extremities to prevent undue introduction. The mechanism is arranged by means of a rod within tubing 5-16ths in. in diameter; the expansion secured by a screw at the manual extremity. The blades, when separated to a maximum, present the appearance of producing a wedge-shaped dilatation, the apex of which is at the os externum. This is, however, more apparent than real. Each blade thickens and widens from point to shoulder from  $\frac{1}{8}$  in. to  $\frac{3}{8}$  in., and necessarily springs most where weakest and where it meets with the greatest resistance—the internal os. When both are then separated by the turning of the screw, practically there is secured a parallel dilatation throughout their length—for more than two-thirds of their expansion. The construction of the mechanism by means of a screw produces dilatation gradually, steadily, and uniformly; and consequently with less pain than by Ellinger's or Atlee's method. Dilatation, too, may be carried on as slowly or as rapidly as the operator desires—one or a number of sittings being occupied. The maximum separation is  $\frac{1}{2}$  in., sufficient to rupture some of the surrounding fibres, when the dilatation has been rapidly performed.

The instrument is first introduced within the cervical canal and expansion effected laterally; subsequently, if deemed nec-

essary, it is turned and the dilatation further carried on antero-posteriorly or obliquely.

The small size of shank, made from tubing, will be found advantageous in manipulation through or without the speculum.

Manifestly now, this instrument has no small value in facilitating both the diagnosis and the treatment of uterine affections. To determine how much, it is necessary to institute somewhat of a comparison with the various other means of dilatation.

For diagnosis, its field of utility is certainly limited.

1. It may be found exceptionally useful, previously employed, in straightening and tunnelling out the cervical canal, tortuous or strictured, to aid in the introduction of the uterine sound.

2.. More often useful to aid in the introduction of tents.

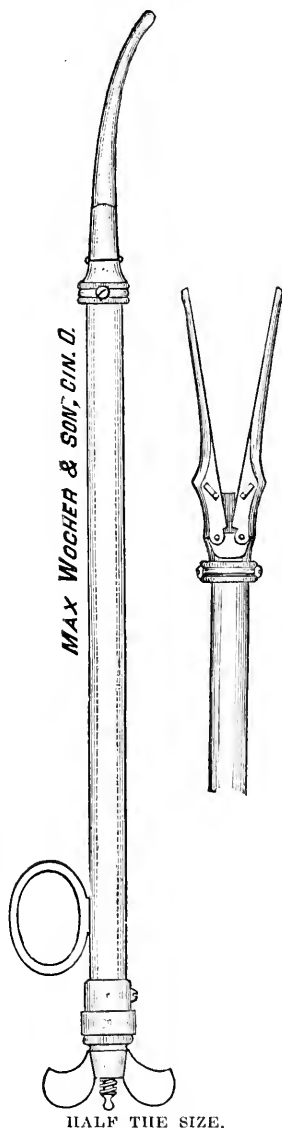
As a means of dilating the cervical canal to permit of digital exploration, it is certainly far inferior to tents.

As a therapeutic means, its field of utility is not limited. It will be found to be useful—

1. To aid in the introduction of intra-uterine stem pessaries, and hysterotomes.

2. To secure sufficient dilatation of the cervical canal to permit of ready and thorough introduction of medicinal agents to the diseased surface of endometrium of cervix and corpus uteri; as by means of cotton-wrapped probe, injections, or ointments.

Every experienced gynecian has realized the difficulties in making thorough applications of fluid medicines to the uterine canal, especially the corporeal cavity, without preliminary dilatation, as well as the necessity for the latter before essaying the use of injections. Here the dilator may supersede in part the use of tents, the employ-



ment of which is expensive to patient, painful, and not altogether safe. Several practitioners, Duncan, Kammerer, Peaslee, and Storer, have used for this purpose the metallic bougie dilator. Some five years ago, I had prepared a series of uterine dilators of copper, three in number, graduated from No. 00 to No. 16. The use of these always was quite unsatisfactory.

It is very apparent that these various bougies may now be entirely superseded by the *dilator*.

3. To overcome strictured and tortuous conditions of the cervical canal with mechanical obstruction to the exit of menstrual flux and entrance of spermatozoa, occasioning thereby dysmenorrhœa and sterility.

The necessity and positive advantage to be derived from a limited dilatation even in neuralgic dysmenorrhœa, are confirmed from clinical experience. These results are obtained after failures from the use of medicines. Evidently, in many instances, the obstruction is but temporary and purely functional; it may be likened to a spasm of the urethra resulting in vesical retention. Barnes goes so far as to say, that the essential cause of dysmenorrhœa, at least in the great majority of instances, is a retention of the menstrual secretion. This statement, on close study of the clinical history, and a thorough inquiry into the various pathological conditions creating painful menstruation, has much less of exaggeration than at first appears. But the explanation of relief obtained by this simple and occasional passage of the sound in neuralgic dysmenorrhœa is in the following: the sensibility of the canal is modified or at least blunted; sphincteritic spasmodic action at the os internum is overcome.

As to organic strictures, these exist by far for the most part, at either the external or internal opening of the uterus, which of the two the more frequently has been the topic of much discussion. The evidence is that the external os is usually involved. In the so-called elongated conical cervix it is unquestionably at this point. This peculiar conformation is by no means uncommon, and produces both dysmenorrhœa and sterility. Acquired strictures of the cervical canal from the vicious use of caustics are almost invariably located at or near the outer opening. What is frequently regarded as a contracted state of the internal os or isthmus uteri is not such, but a normal condition. Bennett is right in saying that we are not to infer there is contraction when the sound fails readily to pass. This difficulty experienced, as he explains, is but the effect of normal sphincteritic action. Still some standard must be erected as to the normal patency of the canal at this point, and this: the

ability to the ready passage of the uterine sound skilfully manipulated.

Aside from the effects of flexions, obstructions at the isthmus uteri seldom exist.

It is acknowledged on all hands that, for the most part, dilatation for organic strictured state, acquired or accompanying faulty conformations, as the elongated conical cervix, by means of tents, sounds, bougies, expanding instruments, is unreliable to accomplish any permanent good, in that the parts within a short period of time return to the original contraction, unless sufficient force is employed to rupture some of the fibres involved and subsequent means are taken to maintain these relations until the final healing is effected. Hence, many have abandoned dilatation and practised instead, incision. A few have even dared to extend these incisions not only throughout the cervical canal, but through the os internum. Frightful hemorrhage has not unfrequently followed; and the patient escaping this accident, septicæmia and inflammation of the peritoneal and cellular tissues of the pelvis, have led to their long train of suffering and even death. Savage, in his most estimable work on "*Female Pelvic Surgery*," places no small amount of weight upon the danger of incisions through the internal os. His language is: "Numerous deaths have been caused by the blind and indiscriminate employment of special machines, more particularly by those acting automatically, carried through the isthmus, forgetful that constriction there, whether congenital or the result of uterine flexion, may be part of the morbid state not amenable to surgery or associated with an attenuation of uterine walls, rendering highly dangerous the touch of the hysterotome." "An incision laterally deeper than  $\frac{1}{8}$  in. at any part of the canal or cervix would be unsafe" (*London Obstetrical Transactions*, vol. vii., page 141). Barnes (page 132 of same) takes similar ground and presents drawings showing the superficial line of vessels around the upper cervix. There are many and strong reasons for believing that these incisions high up within and through the isthmus uteri, have been practised almost solely upon theoretical grounds. Dilatation here is far preferable to cutting.

If then the knife is an unsafe means at the internal os and its neighborhood, and its use ordinarily uncalled for because based upon theoretical notions, and if dilatation by tents without a rupture of fibres is usually only temporarily beneficial, it may be asked what are the best means to remedy organic contractions of the cervical canal, resulting in dysmenorrhœa and sterility? I believe that I will not make an exaggerated statement in saying that the dilator will be found to answer

most generally the purpose of opening up the upper cervix and internal os in such cases. Failing, as it will sometimes do, at the external os, where contractions almost invariably exist, the knife may be resorted to; that of Sims, Emmet, Simpson, Küchenmeister, or Barnes. Incision at this point is altogether another matter, and without special contra-indications uterine and pelvic, with ordinary care and precaution, safe. These incisions should rarely extend above the insertion of the vagina.

The above plan of procedure will be found to be eminently more successful in the relief of dysmenorrhœa than in sterility. While as gynecians we can very truthfully say we cure painful menstruation, on the other hand we can make only feeble boasts in overcoming sterility. Scanzoni has well said that "sterility does very rarely indeed proceed from obstructed or strictured states of the uterine canal. Most cases of the small os externum apparently relieved by dilatation have their causation otherwise. It must be a very small canal that will not admit spermatozoids."

Since obstructions at the internal os are generally owing to flexions—the most common being retroflexion—it is reasonable to suppose that the best method of relieving their effects is by rectifying uterine malposition.

The use of the dilator, gradually expanded at stated intervals, has the power to not only open up the canal and relieve the obstruction, but in certain instances holds out a means of cure itself. The provisional plasma which is thrown out from a rupturing of the surrounding fibres serves to strengthen the organ. Dr. Ellinger, in the paper referred to, reports on the efficacy of this treatment in flexions. I have myself, now, several cases under observation, in which the dilator is being used, which I hope in time to report.

Attention has often been drawn to the benefits from the dilatation of the cervix in *endometritis*. Aside from the facility afforded to the introduction of medicinal agents to within the canal, and free exit of all discharges—expansion of the cervix shortens it, weakens the circular fibres of the cervix, and serves to excite contractions of the longitudinal fibres of the body of the uterus. The contractility of the uterine body is powerfully promoted by a forcible dilatation of the neck (Savage). No other satisfactory explanation can be given for the wonderful success of Baker Brown in controlling menorrhagia and metrorrhagia of intra-parietal hyperplasms. Endometritis is a very common underlying pathological state, inducing and maintaining persistent uterine catarrh and hemorrhage, and any means which will bring about these changes referred to will prove useful in this disease and its results.

One of the effects of chronic inflammation of the cervix uteri is to produce enlargement with induration of tissue. This state is at times remarkably improved by the use of sponge-tents, not by simply dilating the canal, but through the influence of pressure softening the indurated tissue and creating absorption. Here the dilator can in no way take the place of the sponge-tents; in fine, it is doubtful whether the instrument should be employed at all with this condition of the cervix, for fear of exciting acute inflammation of the endometrium and peritoneum.

The dilator should not be introduced within the uterus if in any way there is a diminished mobility from surrounding adhesions. Nothing could be more hazardous. The danger of essaying any of the means of dilatation, tents for instance, under such circumstances, is well known.

Is the dilator, within its own appropriate field of utility, as safe a means of dilatation as tents? We believe it is more safe. The danger from tents arises not so much from the amount or extent of dilatation, but from the retention of a foreign and decomposing body within the uterus. Practically, then, we have less to fear from septicæmia and inflammation from the use of the dilator. The objection may be presented that the expansion of the cervical canal is effected too rapidly. Not so. Already it has been mentioned that the dilatation is entirely within the control of the operator; *slow* and *gentle*, within any number of sittings, or *rapid*, within the space of a few seconds, with a rupturing of fibres. If employed in inappropriate or ill-selected cases, or if undue force is used when uncalled for, and bad results follow, the blame rests with the practitioner and not with the instrument.<sup>1</sup>

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ON THE COMMON SKIN DISEASES OF CHILDREN. By ALFRED WILTSHIRE, M.D., M.R.C.P., Lond., Physician for the Diseases of Women to the West-London Hospital. (*Trans. London Obstetrical Society*, vol. xv., 1873.)

In preparing the following paper the writer's aim has been twofold—first, to describe succinctly, and he hopes simply, the affections of the skin met with in every-day practice; and, secondly, to detail the treatment he has found most effica-

<sup>1</sup> Having used Ellinger's instrument quite frequently, we have noticed the objections stated by Dr. Palmer, particularly the unsteady nature of the dilations, the unnecessary bulk of the handles, and besides, the impossibility of fixing the instrument at a certain point of dilatation, except by their continual compression. The screw-action is certainly much more convenient, steady, and safe, and we are, therefore, although as yet only on theoretical grounds, inclined to accept Dr. Palmer's dilator as a decided improvement.—ED.

cious. The rarer forms of skin disease are not described, not, however, from lack of interest in them, but because to deal with them even briefly would unduly lengthen this communication.

The forms of skin disease which it is proposed to consider are comprised in two classes—*first*, the parasitic—scabies and herpes tonsdens (or ringworm); and, *secondly*, the inflammatory—eczema, impetigo, erythema, and intertrigo.

These forms will be admitted on all hands to be common enough, and, apart from other considerations, their very frequency constitutes a strong claim on the attention of the practitioner of pediatrics.

#### GENERAL OBSERVATIONS ON PARASITIC SKIN DISEASES.

It is the writer's decided conviction that really healthy children rarely suffer from parasitic affections of the skin, whether of animal or of vegetable origin. It must be obvious to all that parasites, especially of the vegetable kind, abound; and observation teaches us that numbers of persons escape who are certainly abundantly exposed to the chances of contagion. Why do they escape? The answer must be, I apprehend, because the parasites do not find in them a nidus or soil favorable to their development. One of the ablest dermatologists of the age, Mr. Jonathan Hutchinson, says, in a late lecture,<sup>1</sup> "There is good reason for believing that cryptogams will flourish only on some skins; and every one must be familiar with the very different kind of irritation which fleas and bugs produce in different individuals." This mode of habitually regarding parasitic skin diseases has, the writer believes, been of great service to him, since it has led him to consider the improvement of the patient's general health as the first thing to be aimed at; the merely local treatment, highly important as it undoubtedly is, occupying a secondary position. This attitude towards the parasitic class of skin diseases has been attended by a very gratifying meed of success in treatment, inasmuch as, combined with celerity at least equalling that of other methods, much more durable results are obtained, the tendency to relapse or rather reinvasion being infinitely lessened. Usually, then, the presence of a parasite on the skin should be held to be indicative of lowered tone, and the more widely spread are the evidences of the intruder the more certain does it become that the general health is depressed. The practical outcome of this is obvious; if we would succeed in dealing with this class of skin diseases our first endeavors

<sup>1</sup> *Medical Times and Gazette*, February 22, 1873.



should be directed towards the improvement of the general health. This the writer believes may be best attained by (1) better hygienics, using the word in its broadest sense, including an improved or amended dietary; and (2) by certain drugs, among which cod-liver oil and steel wine hold the first rank. It is unnecessary to go into detail on these several points; it is obvious that better air and food, baths and rigorous cleanliness, are all important. As regards drugs the treatment considered most appropriate will be mentioned when discussing each disease.

The parasitic skin diseases which it is proposed to consider embrace an example of each form, viz., the animal and the vegetable; and first we will take *itch*, which belongs to the former.

Scabies, as is well known, depends upon the presence of an insect, the *Acarus scabiei* or *Sarcoptes hominis*, the female of which, burrowing in the skin for the purpose of depositing her eggs, excites an inflammation, which causes itching and provokes scratching. The male insect also burrows, but to a much less extent. In children the favorite seats of the itch eruption, or, more correctly, habitat of the insect, a point of considerable clinical importance, are as follows: In *young infants* the soles of the feet, because the skin is here very soft. It is seldom seen on their buttocks, because babies wear napkins. Children a little older, who are often carried in arms, but do not wear napkins, show the eruption chiefly on the buttocks, but also on the hands. This arises from contact of the nurse's arms and hands with the naked buttocks of their charges. Children who can run about and are not often carried in arms show the eruption in the usual well-known place, viz., between the fingers, but also on the exposed parts of the arms and legs and sometimes on the buttocks. It is remarkable that the face is rarely if ever attacked by the insect. It is said that very young children who sleep with their heads under the bedclothes are sometimes so affected. As in older persons, the presence of the itch insect is liable to excite various other eruptions besides that proper to itch, which may be called a vesicle, raised by the burrowing female. Thus, to mention the complicating eruptions in the order of frequency with which they commonly present themselves, we may mention eczema, ecthyma, and urticaria, which may appear separately or together. Usually, however, except in chronic and neglected cases, or in patients with very irritable skins, they do not coexist. Lichenous and other eruptions may also appear. Diagnostic difficulty sometimes arises from the masking of the original affection—the scabies—by that which is

secondary to it, viz., the eczema, erythema, or urticaria, as the case may be, and therapeutically the recognition of this is important.

*Treatment.*—This, in the first place, should be directed to the improvement of the general health, since scabies, even if it be contracted, rarely, if ever, spreads or persists in quite healthy and robust children. An amended or better regulated diet will sometimes alone suffice for this. In the majority of cases, however, some form of iron (to be chosen according to circumstances and indications) and quinine, or cod-liver oil, are required; usually cod-liver oil and steel wine answer admirably, but the steel wine should be made with sherry and that good of its kind, for thus made it is very much more digestible (and physic, like all other ingesta, has to be digested) than when otherwise compounded. Locally, it is necessary to exercise great discretion when there is much eczema. In this case a warm bath containing a little borax or a small quantity of carbonate of soda, together with fine oat, or, for better patients, almond meal, should first be given. This will soothe and cleanse thoroughly without irritating the sore skin. After the bath, if the eczema be very severe, it is best to use only zinc ointment at first or until the eczema has subsided somewhat, and now and then this alone will suffice, even when the presence of the itch insect has been previously demonstrated. When the eczema is less extensive and severe, and, generally speaking, as a rule, even in the presence of eczema, a mixture of zinc and sulphur ointments should be used; the proportions may vary according to the requirements of the case; equal parts serve well. The same may be said when pustules complicate the attack, but sulphur may, and indeed should, be used much more freely in the presence of pustules than of eczema, there being much less risk of irritation.

The cardinal rule in local treatment should be always to treat the itch first and chiefly, and for this purpose nothing in my experience equals sulphur.

The application of a lotion containing borax or a little carbonate of soda in elder-flower water will generally give great relief when there is much irritation of the skin, and especially in the presence of urticaria and lichenous eruptions. In all cases washing the skin with fine oat and almond-meal may be resorted to if required. No ointment containing sulphur should, as a rule, be used longer than three days, else there is great risk of causing the eczema and irritation of the skin which that drug is liable to set up. At the end of three days, supposing there be no lesion of the skin contra-indicating it, the patient should have a full bath of soap and warm water, and afterwards should

be clad entirely in clean clothes; he should also have clean sheets, pillow-cases, towels, &c. The child's nurse should also be thoroughly treated in like manner, scrupulous care being taken to avoid all sources of new contagion. Any eczema remaining at the end of three days, and in severe cases there is usually some, will generally disappear without further or with only simple treatment.

A common source of difficulty in scabies affecting children is in respect of diagnosis, and particularly when the attack is complicated in the manner described. If, however, we remember that in the young infant the *feet*, in the older infant the *buttocks*, and in the little child the hands and other soft parts of the exposed skin, are the favored seats of itch, we shall not often err, and above all the diagnosis may be rendered absolute by the detection of the insect. Syphilitic eruptions on the feet of young infants are so different from scabies that they need never cause embarrassment.

It only remains to say that the treatment mentioned is that which has yielded me the most satisfactory results. I am aware that other plans, doubtless very good, have been recommended, but I can assure the foregoing as thoroughly reliable.

Herpes tonsdens, or ringworm (the common variety, not Favus) is the other parasitic skin disease which it is proposed to consider, and this depends upon the presence of a vegetable parasite, the *Tricophyton tonsurans*. The sources whence it is derivable are many, for not only may it be contracted from other human beings, but also from the lower animals, and I incline to the belief that many of our household pets are not altogether free from suspicion in this matter; it is said, indeed, that the fungus of mange in the cat is identical with that in man, viz., *Tricophyton* (Aitken). Most commonly, ringworm attracts attention when it occurs in the head, on account of the destruction of the hair, but it is by no means confined to the scalp or more hairy parts, though, from the fungus destroying the hair and exciting inflammation of the hair-bulbs, its ravages are more conspicuous there than in smoother parts. The appearance of ringworm is well known—the circular patches, like the fairy rings of the meadows, and probably formed in precisely the same manner, being familiar even to the laity. Though the hair is short and broken, owing to the splitting and destruction of the tubes by the spores and filaments of the parasite, there is no absolute baldness, as in Favus, which depends on a much more virulent parasite, the *Achorion Schöenleii*. When the parasite attacks the hairy parts the disease is readily enough recognizable as ringworm, but this is not always the case when it invades the smooth or downy parts.

Here it is apt to be called *Herpes circinatus*, and its true parasitic character may be overlooked. I am aware that some consider the appearance of the parasite to be secondary to a lesion of the skin, and this may possibly be so, though the evidence on this point is far from conclusive. In almost every, if not every case, the presence of the parasite can be demonstrated, and in support of the opinion that it is the primary element in the lesion the opinion of Von Bärensprung may be quoted, who found that some of the scales of tinea, from one of the lower animals, containing spores and mycelium of the fungus *Trichophyton*, produced a well-marked spot of tinea circinatus in the course of a few days. The risk of non-recognition of the disease is increased when it is accompanied by much itching (from lice, etc.), when eczema, impetigo, and the like, may be superadded and its more ordinary symptoms be thus marked. Ringworm is, as Hutchinson well says, "a disease almost peculiar to children," and is often a source of great trouble and annoyance alike to parents and doctors.

*Treatment.*—First of all, improvement of the general health; this is of cardinal importance. Iron wine and cod-liver oil as adjuncts to good living are, therefore, very useful. Locally, in the absence of any complication, I have found vesication an effectual mode of treatment, but it should not be resorted to in many cases.

Any vesicant may be used, but I have been best pleased with the application of a strong solution of iodine. But on the whole, perhaps, white precipitate ointment is preferable, since with that there is no risk of the ugly consequences which sometimes attend blisters in children. (For my own part, I may say that, except for ringworm, I almost entirely eschew blisters in children's practice.)

Solution of sulphurous acid is a good and harmless remedy, but it should only be applied after all fat has been removed from the skin by means of ether or a solution of caustic potash. Sulphurous acid, *well applied*, is an excellent remedy. Carbolic acid may also be used in solution.

It is important that the head and other parts of the body should be thoroughly searched for commencing spots, so that the risk of auto-contagion may be avoided. All articles of dress likely to convey the germs of the parasite, such as hats, caps, &c., should be put aside or be treated with a parasiticide. Ironing with a hot iron, the fumes of burning sulphur (in other words, sulphurous acid in vapor), or washing and boiling such articles as are washable, are all serviceable methods, and may be used where suitable.

GENERAL OBSERVATIONS ON INFLAMMATORY SKIN DISEASES.

In the foregoing remarks the writer has endeavored to set forth the advantage and importance of regarding a predisposing condition of body as the chief element in skin disease of parasitic origin. He would now beg to draw attention to the great advantage to be derived from regarding the second class, comprising eczema, impetigo, erythema, and intertrigo, as essentially inflammatory, that character underlying the whole of these forms, which are merely varieties of dermatitis, differing rather as to seat and degree than in essence. "Eczema," says Mr. Hutchinson, "is really a name for a symptom, and not the disease itself," and the same may with equal truth and force be said of impetigo, erythema, and intertrigo.

They are all inflammations of the skin, and the names they bear have been given to the features which are believed to be chiefly characteristic of them.

ERYTHEMA AND INTERTRIGO.

It will, perhaps, be well to begin the consideration of inflammations of the skin by referring to the above, which are probably the simplest forms of dermatitis. They may well be considered together, since if not identical they are closely allied and frequently coexist, especially in the neighborhood of the buttocks and groins.

By some, intertrigo is spoken of as "erythema intertrigo," which implies that it is an intertriginous form of erythema, and there can be no objection to this if the differences between it and simple erythema be borne in mind.

Erythema consists in a diffuse redness of the skin, accompanied usually by more or less heat, and may appear anywhere on the body. It is a low form of dermatitis, and is usually caused by some external irritant—in children most commonly by urine, feces, or some unhealthy secretion. It arises when the surfaces of two opposing skins are continuously in contact and the natural secretions are not removed by washing. It is, therefore, often seen in the flexures or folds of the skin, and especially in fat children. It is sometimes seen in a diffuse form on the nates of children, and is commonly caused by neglect on the part of the mother or nurse in changing the child's napkins. Another fertile cause is the dirty practice of drying and reapplying napkins that have been soiled only by urine or but slightly by feces also. This objectionable practice is common among the poor, and the rough napkins, impregnated with urine salts, form an efficient irritant to the nates of the young child. It may also arise from a too vigorous appli-

cation of soap, and especially of the coarser sorts. It is seen also in febrile and intestinal catarrhs, and rarely fails to appear after a time in most of the chronic affections of children. The commonest seats of erythema are, in the young infant, upon the nates and around the anus and genital organs (rarely in them elsewhere), and in older children, in addition to the foregoing seats, it is seen at the flexures of the limbs, about the folds of the neck, &c. Usually, and especially if chronic and about the buttocks, when the erythematous surface is pressed by the finger a yellowish white spot is left, which only slowly resumes its dusky red color. There is rarely, if ever, itching in simple erythema.

*Treatment.*—Generally we should seek to improve the health and correct unhealthy secretions. Thus, when the bowels are deranged, as often happens, an occasional but not habitual dose of rhubarb, gray powder, and soda, will prove very serviceable. Tonics are also useful.

Locally, scrupulous cleanliness should be observed. For the purpose of ablution nothing is so good as almond or oatmeal in water. The softest diapers should be used. The parts may be dusted with a mixture of bismuth and starch powder, or, if threatening to crack, with bismuth and finely sifted oxide of zinc, which latter is best applied by means of a muslin bag; lycopodium may also be used, and now and then a curd made by adding Liq. plumbi to new milk is very soothing.

*Intertrigo* is really an exaggerated form of erythema which has gone on to destruction of tissue, leaving ulcers of greater or less extent and depth. Sometimes these assume serious proportions. I have myself seen huge excavations of both groins from this cause alone in an otherwise healthy and well nourished, though, as far as cleanliness was concerned, neglected child. Intertrigo, indeed, may safely be said always to originate in neglect. When two folds of skin are kept in constant apposition and the natural secretions of the part are not removed by washing, after a time, longer or shorter according to the constitution of the patient, being especially short in the scrofulous, an erythematous blush, generally accompanied by some angry-looking miliaria, shows itself. If the neglect be continued, ulceration begins, and a kind of excavated fissure is formed. Not unfrequently this is followed by glandular enlargement, and often it is only the complaint of the child arising from this cause which attracts the attendant's notice. It is well occasionally to look for one's self at the flexures of infants under treatment for any affection, since erythema, and particularly the intertriginous form, is frequently overlooked by those who have charge of them. Intertrigo is generally met with in

very fat children. It is worthy of remark that the discharges do not crust, as in impetigo.

*Treatment.*—Usually intertrigo is very amenable to local remedies. The principle to be kept in view in all cases is the separation of opposed surfaces. This alone, with cleanliness, will sometimes suffice for cure; but in bad cases, and in fact as a rule, since the sooner we can cure all such cases the better, the cure is expedited by the application of zinc ointment or by dressing with oxide of zinc. Whichever we use it should be applied on the outer surface of a double fold of lint, like dressing the outer side of the covers of a book, so as to insure the separation of the opposed skins. Some forms of erythema, especially when depending on unhealthy secretions, are much less tractable than the intertriginous form usually is, and our first care should then be the general health. Well-made calamine ointment is sometimes very useful. Now and then more stimulating applications are needed, among which may be enumerated camphor lotions, lead and opium, nitric acid and opium, potassio-tartrate of iron, etc.

#### ECZEMA.

This disease is the great centre-piece of skin affections. It is the commonest and by far the most important.

It is before all things important to bear in mind the true pathology of this form of skin disease. It is a dermatitis or inflammation of the skin, and has well been likened to that form of inflammation of the mucous membrane which we call catarrh. "The inflammation is limited to the superficial layers of the skin, and is accompanied by a serous exudation on its free surface," says Niemeyer. Most people, without having any very definite ideas as to the relation that exists between them, are aware that there is some connection between eczematous eruptions and certain internal complaints. Regarding them as analogues one of the other, and both as due to inflammation accompanied by serous exudation, we acquire a clearer notion of their true relationship.

According to Trousseau, Dr. Duclos, of Tours, attributes what he calls "continuous asthma" to an eczematous eruption on the mucous membrane lining the air-passages, which he is said to treat successfully by means of sulphur. Eczema may arise and exist alone, as when it originates in a constitutional taint, or, as we saw in the case of scabies, it may be superadded to and engrafted upon another affection of the skin, to which it bears the relation of an epiphenomenon. In such cases it not unfrequently masks the primary disease, thereby rendering

diagnosis difficult to those who happen to be unacquainted with this fact.

Like catarrhs it may originate from within, as when it depends on constitutional dyscrasia or venous obstruction; or be excited from without, as when it is caused by irritants of various kinds, such as heat, the itch insect, mercury, sulphur, etc. Vesicles are found in eczema, but, owing to their minuteness and to their bursting easily, they are rarely seen. A more or less copious weeping of an acrid fluid, having an alkaline reaction and a peculiar odor,<sup>1</sup> is generally met with, but occasionally it dries up or is so small in quantity that only dry scales are produced.

From its presenting various aspects many names have been given to eczema which are supposed to denote the different forms of the affection, but being founded on no scientific principle this plan has the effect of confusing the mind and burdening it with a number of useless if not misleading terms. It is better to regard the disease as an inflammation, and its different forms as variations due to seat, degree, and like accidental or non-essential circumstances.

There has been much discussion as to the exact seat of the disease. Niemeyer, as we have just seen, states that "the inflammation is limited to the superficial layers of the skin;" Bielt thought it was in the vascular membrane of Eichorn; Cazenave and Bazin, in the sudoriparous glands. Hardy thinks all the elements of the skin are involved.

Clinical observation would incline me to regard the eruption accompanied by serous exudation (*i. e.*, eczema) as an inflammation of the upper layers of the skin (except when very chronic, when all the elements of the skin may be the seat of hyperplasia). That accompanied by a puruloid or sero-purulent secretion (*i. e.*, impetigo) I regard as an inflammation of deeper layers, and this I believe would account for or explain why, even in severe and chronic eczema, we usually get no glandular enlargement, while in impetigo, even of very short duration, the lymphatics take alarm at once. It should also be noted that the reaction of the respective fluids in eczema and impetigo are opposite, being alkaline in the former and acid in the latter. Is it possible that this difference is due to difference of structure, and that to the acid quality of the secretion in impetigo is due the extreme sensitiveness of the lymphatic system? (Parenthetically it may be remarked that probably the acid be-

<sup>1</sup> My friend, Dr. Mapother, of Dublin, speaking of eczema, in his "Lectures on the Treatment of Chronic Skin Diseases," says that "a smell like that from goats often arises from decomposition of the sebaceous fatty matter, giving off caproic acid."



longs to the fatty series.) Like catarrh, eczema is a disease of the surface rather than of the parenchyma.

As already stated, a constitutional diathesis exerts a marked influence in the production of eczema. Thus, scrofulous children are very prone to it, as they are to catarrhs of the mucous membranes. The subjects of scrofulosis exhibit a remarkable proneness to implication of their epithelial structures, whether covering the surface or lining the cavities of the body; hence the relation between eczema and certain affections of the internal organs, as bronchitis, enteritis, gastritis, etc. Rickety children are also disposed to eczema. On the other hand, we not unfrequently meet with cases where the patient is the subject of severe eczema, though otherwise in apparently robust health. Here some constitutional vice may underlie the affection, slight excitation sufficing to elicit it. I believe the offspring of gouty persons, especially if also scrofulous, are very prone to eczema. Indeed, the relations or pathological affinities of eczema are of singular interest.

Hardy, as well as Hebra, affirms the frequency of cancer after eczema, and Bazin goes so far as to say that cancer is the natural termination of eczema. Hebra it is, I think, who dwells upon the frequency of uterine cancer after eczema.

It may, perhaps, be said with truth that, as a rule, eczema in children is secondary to some constitutional state. Oxalate of lime is apt to appear in the urine of eczematous children, which sufficiently indicates perversion of certain normal processes.

In eczema, unlike erythema, there is great itching, which excites an uncontrollable desire to scratch, an indulgence in which rarely fails to aggravate the disease. It is not a little curious to observe that, however chronic or severe eczema may be, it does not usually excite inflammation of the neighboring lymphatic glands, a clinical fact of some interest, which, according to my observation, is almost, if not quite, invariable.

This, as I have already implied, is doubtless owing to the superficial papillary layer alone being affected. In impetigo (and possibly in a few cases of *sharp* eczema), where the deeper layers of the corium are speedily involved, we may very quickly get glandular enlargement.

Eczema is the commonest disease of the scalp before and during the period of first dentition. Perhaps it most commonly occurs in a partial form on the face and head, these being its most frequent seats. Strumous children are prone to eczema at the flexures of their joints. The disease may also become general, and in this form is often a most serious and troublesome affection.

According to my observation, when arising from constitutional causes, the following is the order of frequency with which the various forms appear: One or (usually) both sides of the face; the face and head; the flexures of the limbs; and the so-called universal form, a term which must not be accepted as literally correct, since some portions of the skin usually escape. But it must be borne in mind that, even when originating in a constitutional vice, local irritations are liable to determine the seat of the eruption. Thus, frequent washing of the face and limbs with coarse soap may determine and keep it up.

As in some other diseases, symmetrical arrangement of the eruption is very suggestive of constitutional origin. When originating in purely local causes, of which itch is probably the most common, it is generally seen on the parts of the body where the skin is softest. In very chronic and inveterate eczema the skin in time becomes thickened and indurated from inflammatory hyperplasia, but this is not often seen in children.

It is a matter of common observation that eczematous skin affections often alternate with disorders of the internal organs, as where the suppression of the eruption is at once followed by a cough or diarrhœa, or some other manifestation of a like kind. It is well known, too, that in some children eczema attends the cutting of every tooth, just as we see a diarrhœa or a cough under like circumstances, when it is called a "tooth-rash" or "tooth-cough," as the case may be. The gums should, therefore, be looked to. Improper or insufficient feeding is sometimes an efficient cause of eczema in young children, and too much care cannot be bestowed on this particular.

My own conviction is that sugar and starchy matters are very injurious in some cases, while in others the fault may be in an excess of nitrogenized food. In London, perhaps, the former error is the more common.

*Treatment.*—No disease of the skin tries the resources and skill of the practitioner more than this, and few anything like as much.

If a routine plan be adopted for every case, failure is certain to attend the practitioner's attempts in a large proportion of cases. It will have been gathered from the preceding remarks that cases of eczema permit of being arranged in two or three groups. Thus, there are those arising from constitutional causes, which may be divided into two classes—(*a*) with lowered vitality, and (*b*) with otherwise robust health. Then there are the cases which are due to purely local causes, whether external or internal, as when the itch insect or some surface irritant excites the eruption, or when it follows or attends or ac-

companies the evolution of a tooth or the ingestion of some indigestible morsel.

Careful differentiation, then, is requisite before determining upon a plan of treatment; and even when this has been determined upon, it naturally divides itself into the application of local and general remedies.

*General Treatment.*—When the health is depressed and nutrition has failed, strict attention should, in the first place, be paid to diet. Anything likely to excite urticaria, such as starches and sugars, should be avoided, for the itching and irritation which accompany nettle-rash greatly aggravate eczema. Lime-water with milk is very useful. So are well-made broths and beef-tea.

Tonics may be necessary to improve the appetite, and other medicines to improve digestion. Steel wine and cod-liver oil are powerful for food, and so, rightly used, is quinine. When there are great restlessness and sleeplessness bromide of potassium is of great service.

Chloral, I fear, is apt to cause itching of the skin in eczematous patients, but it answers sometimes. If oxalate of lime be present in the urine, nitro-muriatic acid and bark are very useful. In some cases syrup of iodide of iron suits well, and may advantageously be alternated with other forms of iron or with the acids. In rickety and badly nourished children attention to the bowels is well repaid. The old-fashioned rhubarb, soda, and gray powder answers admirably.

When the general health appears good a different line of practice is called for. Here great attention to diet is necessary, error usually lying in the direction of excess, and especially in the matter of nitrogenized food.

Lithates or oxalate of lime in the urine indicate potash or lithia and nitro-muriatic acid. An occasional purge of calomel and jalap, or of sulphur, is very useful. Sometimes nothing answers so well as a combination of Cal. gr. i. to iss., with gr. x. or more of Sulphur præcip., and especially if there be bronchial irritation. The exhibition of decoction of hop and *Triticum repens* answers admirably in some cases. Now and then opium and belladonna may be required. It is in this class of cases that the preparations of arsenic yield the best results, that is, in cases of long duration, when there appears to be some constitutional vice at the bottom of the matter, and but little evidence of failure of the general health.

Veiel believes arsenic to be most useful in those skin affections which are accompanied by infiltration of the cutis, such as we have seen occurs in long-standing eczema. When there is any suspicion of a syphilitic taint, Donovan's solution is an

excellent remedy. In a few cases of eczema cantharides may be successful, but they require very cautious use and are of restricted application. For my own part I very rarely use them.

Here and there a case will yield readily to antimony, which appears to be indicated in well-nourished and firm-fleshed children, whose skins are harsh.

*Local Treatment.*—Perhaps for no disease of the skin have so many things been devised for external application as for eczema, and the great value of some of them has led to the belief that they alone suffice for its cure. This is the view of Hebra and others of the Continental schools, but it is one to which I cannot subscribe. In my judgment success is best achieved by a judicious combination of both methods, though certainly the results of simply local medication are oftentimes very striking, and occasionally I restrict myself to it.

Our first aim as regards local treatment is, in most cases, to soothe. For this purpose I recommend washing with fine almond or oatmeal and water. Soap, as a rule, is interdicted. Decoction of poppies or marshmallow may sometimes be profitably substituted for water, but the oatmeal should never be cooked. After gentle drying various things may be applied, according to the indications. Thus, if there be much irritation and exudation, dusting with fine oxide of zinc through muslin is very soothing. So is bismuth (the old-fashioned trisnitate). Occasionally the addition of a little tannin to the foregoing or to starch powder is very serviceable. Tannate of glycerine often answers admirably. With many skins greasy things disagree. This may be owing to the decomposition of the fat by the alkaline exudation. Perhaps for all eczematous eruptions nothing equals the white precipitate ointment. It is in my experience an admirable remedy. I think it suits best when the white precipitate is added to benzoated zinc ointment. I have never seen any ill results follow its use, even when applied for prolonged periods. The preparations of tar are at times of striking use, probably they are most useful in chronic cases accompanied by much thickening of the skin. Lotions containing lead will often give satisfaction. They may be combined with morphia or hydrocyanic acid, though usually it is not desirable, nor is it necessary, to resort to these drugs in children's practice. Now and then lotions containing glycerine relieve, but more commonly they cause much pain; this is probably due to the affinity of glycerine for water, which it abstracts from the tissues.

Lotions of carbonate of soda or borax are frequently useful, and a little wine of opium goes well with them. In limited but sharp eczemas a curd made by adding Liq. plumbi to milk

often relieves. So will calomel ointment when the eruption is around the anus. When the hands or eyelids are attacked citrine ointment is useful.

Glycerine of tannin, already mentioned, in some cases acts like a charm, and may be well applied by means of a camel-hair pencil.

It is sometimes necessary to muffle the hands of young children who suffer with eczema of the face, since by their scratching they greatly aggravate and keep up the disease.

It cannot be doubted that sometimes the recession of eczema is followed by bronchitis, and mothers are occasionally fearful of bad consequences from the cure of the skin affection. In such cases considerable care is requisite, and any tendency to chest complication should, if possible, be warded off by bringing into play another set of emunctories, *e.g.*, those of the intestine. It is in cases of this description that antimony is very useful. It is well at the same time to give frequent doses of aperients if the antimony does not act as such, and I have been best pleased with the sulphur and calomel purge, gr. x. or more of the former and one or more of the latter.

#### IMPETIGO.

This is also a form of dermatitis, and is characterized by the formation of numerous small pustules. The puruloid liquid dries up into yellowish, greenish, or dirty brown crusts, the shrivelling or shrinking of which at times causes great irritation of the skin. The eruption may appear on any part of the body, and in those predisposed to it any scratch, abrasion, or other superficial wound, may take on an impetiginous action. Its favorite seats, however, are the head (where it is almost invariably accompanied by lice), the face (especially about the mouth and chin), and now and then the limbs. It is sometimes seen behind the ears, but not so often as eczema. It frequently exists undetected in the heads of children who are ill-cared for until inflammation and enlargement of the glands of the neck cause the child to complain. Doubtless it has occurred to others, as it has hundreds of times to myself, to have cases of inflammation and abscess of the glandulæ concatenatæ brought for that condition alone, the eruption in the scalp not having been suspected even by the parent.

A search always reveals spots of impetigo, and the heads of such patients are always invariably very much infested by lice; it is probable that the first step in the production of the disease is caused by the scratching occasioned by the presence of these insects. When once set up it quickly spreads and is highly contagious. Children who have impetigo are scarcely ever, I am

disposed to say never, in good health. It is especially apt to attack the scrofulous, who are of vulnerable constitution. This accounts for and explains one of the most striking features of impetigo, viz., its very pronounced tendency to cause rapid and severe inflammation of the neighboring lymphatic glands. This is its special characteristic, and is a feature of great clinical significance, enlargement of the glands often leading to the discovery of the hidden eruption, and particularly when the latter is covered with hair.

As has already been stated in the foregoing section, this form of dermatitis is closely allied to eczema, only that the two diseases affect different portions of the skin, while there is a marked difference in the character of their respective exudations and in the tendency to excite glandular inflammation.

It should not be forgotten, however, that as both originate in inflammation of the skin, the two kinds of dermatitis may occur in a more or less mixed form, thus giving rise to what is called "eczema impetiginodes."

It is held by some that the characteristic pustules of impetigo are produced *only* by inflammation of the hair-follicles, a point upon which for the present I prefer to withhold any opinion.

But as regards the statement that the vesicles of eczema have no connection with the hair-follicles I am disposed to concur.

*Treatment.*—No disease of the skin yields more gratifying results than this. The first thing to be aimed at is the improvement of the general health, and as the patients are usually the subjects of scrofulosis, and not unfrequently rickety, this is best accomplished by improving the diet, by change of air, and by the exhibition of cod-liver oil and steel wine. Quinine is also extremely useful in this disease. It can readily be added to Vinum ferri.

Now and then the syrup of iodide of iron suits well, and especially if there be otorrhœa. Attention should also be paid to the bowels.

Locally, as a rule, it is best not to attempt to remove the crusts by poulticing, etc.; they will soon come off under appropriate treatment, and no time is lost or pain caused by attempts at their premature removal. The application of an ointment consisting of ten, fifteen, or twenty grains of white precipitate to an ounce of zinc ointment is attended by brilliant results. The effect of this ointment is very striking. It should be applied twice or even thrice a day. The scalp should always be searched and the hair cut off and from around all suspicious spots.

The skin may be cleansed by oat or almond meal and water (made of the consistence of thin cream without boiling). No danger need be apprehended from the white precipitate. In many hundreds of cases I have never seen any evil results or sign of absorption follow; on the contrary, its use has been attended by the most gratifying results. This preparation of mercury is not readily absorbed from the skin, and besides, its use is rarely required for more than a very short time. Occasionally, and especially in the presence of pediculi and their nits, the use of an ointment composed of equal parts of white precipitate and sulphur ointment is preferable and answers well.

Certain skin diseases of common occurrence have thus been (it is feared very imperfectly) reviewed from a practical standpoint; and the writer hopes the attention kindly bestowed on the reading of this paper may not have been unduly trespassed on or the time wasted. He begs to offer his best thanks for the courtesy shown him.

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A STONE OF THE UTERUS OBTAINED BY AMUSSAT IN 1829; ITS HISTOLOGICAL EXAMINATION DECIDING IT TO BE A CALCIFIED FIBRO-MYOMA. By Dr. ALBERT HENOCQUE. (*Archives de Physiol.* v.) With Plates I., II., and III.

CALCAREOUS concretions, or stones of the uterus, are rare and curious phenomena; nevertheless, Louis, in 1753 (*Mém. de l'Acad. Roy. de Chir.*, ii., p. 130), had collected 18 cases, and since then Velpeau, Coze, Arnott, and others have reported additional instances. Cruveilhier considers the majority of stones of the uterus to be ossified fibrous tumors. After the presence of smooth muscular fibres in the stroma of fibrous tumors of the uterus had been demonstrated by Bidder, Waller, Vogel, Lebert, Ferrier, Oldham, and Barnes, from 1842 to 1854, Virchow, Foerster, and Rokitsky admitted the possibility of these fibro-myomata being the seat of partial or total calcification. Accordingly, the author is inclined *a priori* to consider stones of the uterus to be calcified fibro-myomata, which are easily distinguishable from concretions or calculi by decalcification of the tumor, that is, by treating it with hydrochloric or nitric acid; or, if it have been recently removed, with dilute chromic acid. Henocque, therefore, examined the present specimen (which was handed him by Dr. Alphonse Amussat, who had it from the collection of Amussat, sen., who found it in the uterine wall of an old woman who died at the Salpêtrière in 1829; it was exhibited to the Academy of Medicine in the same year), the external appearance of

which is that of an ovoid sponge, formed like a cerebral hemisphere, measuring 40 centimetres in its great and 20 centimetres in its small circumference. (See plates I. and II.) Numerous fissures and depressions of greater or less size and depth are visible on both sides of the stone, separating prominences, the surface of which has the consistence and color of yellow ivory; the texture of the tumor is less firm than that of bone, it breaks easily, and does not permit fine sections to be made; the fracture is always lamellated. A portion of the tumor was macerated for 24 hours in hydrochloric and nitric acid, diluted with five times their volume of water, and from the elastic fibroid structure remaining (which presented the exact form of the portion subjected to maceration) fine sections were easily made. Under a power of 90 diameters these sections show large, interlaced, flattened bundles of a certain thickness, arranged in various layers communicating by interlaced fasciculi. (Plate III., Fig. 1.) The bundles present longitudinal striæ, analogous to those seen in the smooth muscular fibres of the uterus. The fasciculi can be separated into smaller fasciculi, measuring from 500 thousandth to 100 thousandth of a millimetre in breadth; some, obtainable only by picking, measure only  $\frac{6}{1000}$  millimetres. Yellowish, granular deposits, occasionally arranged in the manner of beads, are seen among these fasciculi, and at certain points there are striæ, uneven and quite distant from one another, as in the smooth muscular fibres of fibro-myomata. (Plate III., Fig. 1.)

With a higher magnifying power (200 to 300 diameters; Nachet, oc. 2, obj. 3), as in Plate III., Fig. 2, by means of picking, fasciculi of smooth muscular fibres can be seen at various spots, with here and there elongated nuclei, measuring  $\frac{3}{1000}$  millimetres in breadth and  $\frac{2}{1000}$  mm. in length, some still smaller, others tipped by fat-granules, either in little patches or in drops. In other spots the muscular fasciculi are entirely degenerated, filled with gray granular fat-globules, and in places accumulations of grayish amorphous substance, intermixed with fat-globules, are visible.

To recapitulate, the uterine calculus in question is a calcified fibro-myoma; it is composed of easily demonstrable muscular fibres; the calcareous salts have been deposited in the substance of these fibres, particularly in their periphery; during the process of calcareous transformation a granular fatty degeneration of the smooth muscular fibres took place.

This process is quite analogous to that observed in calcified fibro-myomata of the intestine, in connection with which Henocque (*Dict. encyclopéd., article Fibro-myoma*, and *Société de Biologie*, 26th April, 1873) has called attention to the im-



portance of studying the texture of the fasciculi in preference even to that of the smooth fibres, because in the latter the nuclei become more or less atrophied or disappear entirely during fatty degeneration and calcification, and their recognition thus becomes difficult or impossible. In conclusion, the author suggests that all uterine calculi preserved in the museums be examined by decalcification, which will succeed equally well in old and new specimens, and that their nature, which will either be that pertaining to calcification or ossification, perhaps foetal productions or placental concretions, be thus ascertained.

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THE LYMPHATICS OF THE NORMAL, NON-PREGNANT UTERUS.

By DR. GERHARD LEOPOLD, of Leipzig. (*Arch. f. Gynäkol.*, vi. 1.)<sup>1</sup>

ALTHOUGH the pathological anatomy of the uterine and the lymphatic ducts of the pregnant uterus have been investigated before this, particularly those of the peritoneum and superficial layer of the uterus, no special examination of the lymphatic vessels of the muscular and mucous coats has ever been made; and there was, indeed, but little known about their origin and course. L. demonstrates by his investigations, which occupied the greater portion of his time for more than two years, that the lymphatic ducts originate in the mucous membrane, whence they pass through the muscular tissue to the serous envelope and into the broad ligament.

The lymphatics of the uterus are divided into those of the peritoneum, the muscular coat, and the mucous membrane, and differ in each of these tissues.

1. The *lymphatics of the peritoneum* are only ducts situated in the subperitoneal tissue, and form large characteristic networks over the whole surface of the uterus. In animals these networks centre in the cornua of the uterus,—in the human female they form numerous small convoluted plexuses on the anterior and posterior uterine surfaces, passing from the body of the organ to the tubes and the insertion of the broad ligaments, the meshes and the ducts growing larger, particularly in the pregnant and puerperal uterus. In places where the peritoneum is not closely attached to the broad ligaments the superficial lymphatics diminish in number, and in various animals (rabbit, dog, sheep) in which the ligaments merely consist of

<sup>1</sup> The report of this exceedingly valuable and interesting paper has been delayed by negotiations entered into to permit the reproduction of the excellent colored diagrams accompanying it; unfortunately the destruction of a portion of the lithographic plates, the news of which has just been received from Leipzig, prevents us from realizing this design.—ED.

thin membrane, no lymphatics whatever are perceptible. The blood-capillaries are more superficial and more numerous than the lymphatics, but the latter are larger, varying frequently in size, and their microscopic meshes are wider; occasionally they send connecting branches to the lymphatic canals of the muscular tissue, but only where the peritoneum is closely contiguous to the uterus; where this is not the case (as at the origin of the broad ligaments) the lymphatics empty directly into the large lymphatic trunks.

2. The *muscular tissue* of the animal uterus contains the following lymphatic receptacles: (a.) Lymphatic tubes, which cross the uterus almost transversely, and communicate directly with the lymphatics of the mucous membrane on the internal, and with those of the peritoneum on the external, surface of the uterus. (b.) Minute *lymphatic fissures* which envelop the fasciculi of the larger muscular bundles, empty into the lymphatic tubes, and thus communicate indirectly with the subperitoneal and mucous lymphatics. This is the case with the animal uterus; in the human organ these lymphatic fissures communicate directly with the mucous membrane. (c.) *Large lymphatic vessels* which lie parallel with the surface of the uterus between the two muscular layers, close to large blood-vessels, and serve as repositories and excretory canals for the lymph into the large trunks in the broad ligaments.

The muscular coat of the animal uterus consists of an internal transverse and an external longitudinal layer of fibres which cross each other; the larger lymphatic vessels run between these two layers, and are distinguishable from the larger blood-vessels, which also occupy the same situation, by their coats, which are formed by the intermuscular connective tissue, and their delicate endothelium; in the muscular tissue itself the blood-vessels form small plexuses, and do not run parallel with the lymphatics.

The muscular coat of the human uterus, as has already been shown by Henle, consists of three layers, fibres of which twine themselves about the larger blood-vessels; the lymphatic fissures run in the intermuscular connective tissue, and occur in all three layers, particularly the second and third, and occupy about the same relation to the blood-vessels as in the animal uterus. The connecting branches between the subperitoneal and the muscular lymphatics are also real vessels. The muscular lymphatics were examined by means of injection and picking; under the microscope such a specimen presented lamellæ of endothelium, with nuclei and nucleoli, and near the nuclei in the larger, lamellæ, fissures. L. considers the lamellæ of endothelium to be the lining of the lymphatic spaces, and the fissures the

entrances from the larger to the smaller lymphatics. Large cell-layers, with one or two nuclei, which enveloped each of the smaller muscular fasciculi, were also observed. L. proves clearly that a direct communication exists between the subperitoneal and muscular lymphatics, and that the latter always run as collecting tubes between the two chief muscular layers, and empty directly into the main branches in the broad ligaments. In the muscular coat of the pig, after injection, the existence of valves in the large lymphatics could be determined with some certainty.

3. The *lymphatics of the mucous membrane* of the uterus of the animals mentioned, and of man, are not, as in the subperitoneal or muscular coats, real round vessels, but merely a colossal system of communicating fissures or cavities (lymphatic spaces—*Lymphräume*), which are formed by the blood-vessels, glands, and connective-tissue fibrillæ ascending from the muscular tissue to the superficial epithelium.

The author makes a few remarks on the capillaries and larger blood-vessels, with their sheaths of endothelium, and discusses the much-debated question of the boundary membrane of the uterine glands, agreeing neither with Leydig (fibrous membrane) nor Chrobak (structureless membrane). He pronounces the *membrana propria* of the uterine glands to be a sheath of endothelium composed of tessellated epithelium with oval nuclei. The mucous membrane itself consists of a delicate framework of connective tissue, receding from the intermuscular connective tissue, which separates at the boundary of the muscular coat into external and internal bundles, the former of which form the partition between the muscular and mucous coats, the latter become more and more delicate and extend between the glands and vessels into the mucous membrane, and constitute a fine network. These bundles are clothed with endothelia, and the spaces between them are the lymphatic spaces. The connective-tissue framework of the mucous membrane is thus quite analogous to that of the lymphatic sinuses of the lymphatic glands lately described by Bizzozero. This network is in direct communication with the endothelial sheaths of the blood-vessels and glands, and the latter pass directly through the lymphatic spaces, separated from them only by the epithelial sheaths.

The author has discovered that the blind terminations of the uterine glands are attached to the base of the mucous membrane not only by the connective-tissue framework, but also by several bundles of the intermuscular connective tissue, which pass to the base of the gland, accompanying it a short distance, and thus secure it in its position.

The mucous membrane of the human uterus differs from that of the animals mentioned above, in being more firmly attached to the muscular tissue, in being folded only in the cervix, and in the greater delicacy and fine network of the connective-tissue framework, whereby the greater abundance of endothelial cells is explained. Otherwise there is no particular difference in the construction of the human and animal uterine mucous membranes. In the human uterus the cavities in the mucosa, in which the lymph circulates, are the same as in the animal. The passage of the lymphatic vessels and fissures of the muscular tissue into the mucous membrane is somewhat peculiar, for the lymphatics of the muscularis dilate in the form of calices as they enter the mucosa, and finally pass into the delicate network of the latter. Of all the writers on the uterine mucous membrane, the opinions of Leydig and Henle most closely resemble those of the author, although none before him have conclusively demonstrated the origin of the uterine lymphatics in the mucous membrane.

The injections were made with Prussian blue, sulphate of baryta,  $\frac{1}{2}$  per cent. osmic acid, or  $\frac{1}{4}$  to  $\frac{1}{2}$  per cent. solution of nitrate of silver. In examining the mucous membrane alcoholic specimens should be avoided, because it is almost impossible to obtain a clear microscopic picture from them. The uterus of the sheep and the pig is best adapted to the investigations; the injection of the human non-pregnant uterus was the most difficult.

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## REVIEWS AND NOTICES OF BOOKS.

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ENGORGEMENT AND HYPERPLASIA OF THE UTERUS ARE NOT INCURABLE. By DR. LUDWIG MARTINI, of Augsburg. Second rev. ed. Augsburg, Dec., 1873. B. Schmid'sche Buchhdlg. (A. Manz), pp. 36.

This pamphlet is certainly a remarkable production, for it contains either a series of fallacies and delusions, or a great and most important discovery—a boon to suffering womankind, which has been most unjustly slighted because, as the author says, “his observations were made in a small country town, and he is no professor,” and which, if actually founded on facts, it would be absolutely criminal to neglect any longer.

Thirteen years ago the author published a number of cases of chronic congestion and hyperplastic enlargement of the uterus of all degrees and in various parts of the organ, which pathological conditions he claims to have removed completely, and cured entirely and solely by the administration of the chloride of gold. A number of these patients were thereby also relieved of their protracted sterility.

Since then he has continued the treatment of various hitherto considered incurable affections of the female genital organs with the same agent, generally omitting all local remedies or applications whatever, and has had the same astonishing and marvellous success. He has not only cured almost all the engorged and hyperplastic uteri which came under his care during a practice of 41 years, some of which were so large as no longer to find room in the small pelvis, but (we quote substantially his own words) with the same remedy has also removed exactly the opposite condition, viz., atrophy and softening of portions of the uterus, with or without simultaneous induration (six cases of softening of the atrophic cervix and numerous others of softening of the posterior wall only); has cured flexions solely by reducing the hyperplasia or building up the atrophic tissue at the angle of flexion; has restored two totally retroverted uteri—one of 7, the other of 14 years' duration—to their normal position; has cured ulcers of the cervix which had a decided cancerous appearance; prevented long-standing habitual miscarriage, dependent on hyperplasia; entirely removed all traces of a large ovarian cyst in five patients, and of one solid ovarian tumor which reached to the umbilicus (!); has relieved leucorrhœa which had resisted all other remedies; cured sterility by removing the hyperplastic indurations of the an-

terior lip of the cervix, and the various hypertrophic occlusions of the cervical canal and the Fallopian tubes (as he supposes, where no other cause for the sterility was apparent), which prevented the free ingress of the spermatozoa, and had the pleasure of seeing numbers of these patients conceive and bear healthy children, after they had long given up all hope of posterity; has succeeded in dissipating a tumor of the size of a hazelnut, and of scirrroid hardness in the anterior uterine wall, and relieving the woman of her sterility, caused thereby; has permanently cured persistent dysmenorrhœa, dependent apparently on some unknown organic (!) change in the Fallopian tubes; in short, has cured, *positively cured*, hundreds of the above-mentioned pathological conditions by the use of the chloride of gold and sodium alone, without mechanical or other local or general means of any kind. He will not allow a single case to be deducted from these hundreds; those who doubt, may inspect his journal. He says that he is neither too sanguine nor hasty in his judgment, nor prone to draw deductions from insufficient premises, but is possessed of a good pair of eyes, and a habit of observation and appreciation, of which he knows how to make a proper use. He admits that mercurial preparations would probably do as well as the chloride of gold, if they could be given without producing salivation; the other alteratives and absorbents, iodine, chromium, barium, silver, and arsenical salts, many alkaloids, by no means exert the specific influence on the uterus and female sexual organs which undoubtedly belongs to the chloride of gold, the benefit exercised by which in his practice should induce all gynecologists to give it a fair and unprejudiced trial. MARTINI gives the chloride of gold and sodium in  $\frac{1}{10}$  grain pills, commencing with two pills, one after dinner and one after tea (the food should contain no acids), and gradually increasing the dose until ten pills daily are taken, which may be divided into three doses; more daily would act injuriously on the stomach; and some care and discretion must be exercised in the administration of the remedy, to avoid disturbing digestion. The use of the medicine thus becomes a somewhat protracted one: its action is necessarily slow; and MARTINI declares himself perfectly satisfied, if an improvement manifests itself after the administration of 20 grains of gold. Usually from 2 to 3 drachms, and 3 to 5 months, are required for a cure. In one case only did salivation occur, after the exhibition of over 3 drachms of auri et sodii chlor., but the patient was rewarded by a complete restoration to health.

These results appear, and certainly are, marvellous and almost incredible, when we consider that almost all the most

renowned gynecologists utterly deny the possibility of *relieving* the affections, which Martini *cured* with the chloride of gold, by internal remedies, and even topical applications of any kind. Still they are reported by a scientific, educated physician, and as such deserve at least credence, and call for investigation and proof. To condemn an apparently incredible statement merely on theoretical grounds without adequate personal experience seems unjust. For the sake of the suffering weaker sex we sincerely trust that Martini's experience is not fallacious, but will be shown by further observations to be true and well authenticated. In discussing the manner of progress of the spermatozoa towards the ovary, which he has occasion to do while explaining the means by which the chloride of gold cures sterility by removing organic obstructions in the genital tract, Martini suggests that the "irritation caused by the semen injected into the uterus during coition may be sufficient to produce contractions of the uterus, which will press the semen through the narrow openings of the Fallopian tubes, and propel it towards the ovary." This view seems hardly in accordance with the now well-known mechanism of the contractions of the uterus, which are of a peristaltic nature, and being stronger at the fundus, and acting concentrically towards the cervix and internal os, would be more likely to press the semen out of the uterine cavity into the cervical canal and the vagina, than into the Fallopian tubes, the access to which is probably closed by these same concentric contractions of the muscular fibres of the fundus and the circular fibres surrounding the tubal ostia.

We should have preferred to see somewhat less *pique* manifested by the author in his refutation of the unfavorable criticisms expressed by the lamented NIEMEYER on his experience with the chloride of gold (published at intervals from 1860-69; Niemeyer considered the chloride of gold to be a nervine, an anti-hysteriæm, and attributed the favorable action of the drug in Martini's cases to this cause, and not to the removal of organic lesions, which existed merely in M.'s imagination); it seems to us that the author's claim to credit for, and belief in, his successes would not have been impaired if he had adhered more closely to the old charitable rule of "*De mortuis nil nisi bene.*"

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THE PARASITES OF THE MAMMARY GLAND (PART II. OF THE PARASITES OF THE FEMALE SEXUAL ORGANS; Berlin, 1870). By DR. HAUSSMANN. Berlin: Aug. Hirschwald. 1874. Pp. 80.

THE parasites found on and in the tissue of the mamma are of two kinds, vegetable and animal, the former infesting the

nipple and areola, the latter the stroma of the gland itself. The vegetable parasites, as a rule, find their way from the maternal vagina into the mouth of the infant during birth, and are thence transferred to the nipple during nursing, causing the acid fermentation of the milk which usually moistens the part, and a variety of dermatitic symptoms. Such parasites are, 1, bacteria and vibriones, which appear to be innocuous; 2, spores of various not clearly definable fungi; 3, spores of the *oidium lactis*, which has been altered by the unequal temperature and the unusual situation, and is really identical with, 4, the *oidium albicans* Rob., the most important of these fungi, the cause of the so very frequent aphthous stomatitis (*muguet*) of nursing children, and the source of much pain, inconvenience, and danger to both mother and child; only the most scrupulous cleanliness will prevent the propagation and growth of this fungus on the affected breast, and the consequent infection of the nursing infant; 5, the *leptothrix buccalis*, which II. has seen only together with the *oidium albicans*, in the mouths of nursing children, but never on the nipple, although SERX has discovered it there, and from analogy there is no reason why it should not be found there as well as the other fungi named. Among the animal parasites the *echinococcus* is the most frequent, although II. was able to collect only sixteen well-authenticated cases in which a microscopical examination demonstrated the presence of the scoleces, a number of cases reported as such being but imperfectly substantiated. There is no particular sign by which an *echinococcus* can be distinguished from any ordinary cyst of the mamma before operation; an exploratory puncture or incision alone would make the diagnosis positive. The parasite grows quite slowly, much more so than in the liver, spleen, and other organs. Besides becoming inconvenient by the pressure and the anxiety its presence causes, the cyst will occasionally suppurate and ulcerate. *Echinococci* of the mammary gland are very rare, but less rare than those of the other female sexual organs (II. was able to find only two undoubted cases of *echinococci* of the ovaries, three of the broad ligament, and seven of the vagina, uterus, and surrounding tissue. According to LERCKART, in all probability the ova or embryonic formations of the *tænia echinococcus* of the dog (this parasite has as yet been observed in no other animal), on being introduced into the intestinal canal, pass through the blood, or, as Virchow thinks, through the lymphatic vessels, into the liver or other organs, thus also into the mamma, and there undergo further development. The operation which promises the best success is a free incision, and the immediate total removal of the whole cyst, whereupon



the wound is closed by sutures, and generally heals without difficulty. Should the cyst be too firmly adherent, its destruction will have to take place by suppuration.

After a careful sifting of the numerous, often exceedingly marvellous, stories of various animal parasites which are reported to have occurred in various parts of the body, the author concludes that no other vermicular parasite of any kind occurs in the mammary gland; only the most rare coincidence might account for the temporary presence of a wandering ascaris in the case of a diaphragmatic hernia agglutinated to the costal pleura, and opening by suppuration into the mamma, and thence perforating the skin.

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A PRACTICAL TREATISE ON THE SURGICAL DISEASES OF THE GENITO-URINARY ORGANS, INCLUDING SYPHILIS. Designed as a Manual for Students and Practitioners, with Engravings and Cases. By W. H. VAN BUREN, M.D., Prof. of the Principles of Surgery, with Diseases of Genito-Urinary Organs, in Bellevue Hospital Med. College, etc., and E. L. KEYES, A.M., M.D., Professor of Dermatology in Bellevue Hospital Medical College, etc. New York: D. Appleton & Co. 1874. Pp. 672.

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TREATMENT OF NERVOUS AND RHEUMATIC AFFECTIONS BY STATIC ELECTRICITY. By DR. A. ARTHUS. Translated from the French by J. H. ETHERIDGE, M.D., Prof. of General Therapeutics, Rush Med. Col. Chicago. Chicago: W. B. Keen, Cooke & Co. 1874. Pp. 144.

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A TREATISE ON PHARMACY. Designed as a Text-book for the Student, and Guide for the Physician and Pharmacist, etc. By EDWARD PARRISH, late Prof. of Theory and Practice of Pharmacy in the Phil. Col. of Pharmacy, etc. Fourth edition, enlarged and revised by THOS. S. WIEGAND, graduate of the Phil. Col. of Pharmacy, with 280 illustrations. Philadelphia: Henry C. Lea. 1874. Pp. 977.

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A CONSPECTUS OF THE MEDICAL SCIENCES, COMPRISING MANUALS OF ANATOMY, PHYSIOLOGY, CHEMISTRY, MATERIA MEDICA, PRACTICE OF MEDICINE, SURGERY, AND OBSTETRICS. For the use of Students. By HENRY HARTSHORNE, A.M., M.D., Prof. of Hygiene in the University of Pennsylvania, etc., etc. Second edition, enlarged and revised, with 477 illustrations. Philadelphia: Henry C. Lea. 1874. Pp. 1024.

This work admirably answers the purpose for which it was designed, viz.: to serve as a book of hasty reference, and an

easy source of information for the busy practitioner, whose extensive practice will rarely allow him sufficient leisure to study exhaustive treatises, or waste time in searching through voluminous text-books for the special subject sought for. The various chapters all contain the most essential points; but the manuals on Anatomy, Physiology, Chemistry, and *Materia Medica*, particularly, are so compendious that it would almost seem as though a general practitioner could well dispense with more extensive treatises on these subjects. The chapter on Practice of Medicine includes diseases of children, and that on Obstetrics gives also the most important diseases of women, both medical and surgical. We must not omit to mention the chapter on Surgery, which includes affections of the eye and ear, and the multitude and novelty of the illustrations in which deserve the highest commendation. Some of these illustrations (the excellence of which throughout the whole book is one of its most noticeable features) we do not remember to have seen in any work on surgery. The author seems to have brought his book down to a very late date; for instance, we noticed a wood-cut of the various rifle-balls used at present—the Snider, Martini-Henry, Needle, Bavarian, Chassepot, and Mitrailleuse. We can heartily recommend the “*Conspectus*” to any physician in want of such a book.

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**ELECTRO-THERAPEUTICS: A CONDENSED MANUAL OF MEDICAL ELECTRICITY.** By D. F. LINCOLN, M.D., Physician to the Department of Diseases of the Nervous System, Boston Dispensary. Philadelphia: Henry C. Lea. 1874. Pp. 186.

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**TREATISE ON FOOD AND DIETETICS, PHYSIOLOGICALLY AND THERAPEUTICALLY CONSIDERED.** By F. W. PAVY, M.D., F.R.S. American Edition. Philadelphia: Henry C. Lea. 1874. Pp. 574.

DR. PAVY'S excellent book contains a vast amount of information on the various articles of food and drink used by civilized and savage nations, their physiological, pathological, and therapeutical effects, and the manner in which they should be prepared and used in order to do the least injury and most good. Covering, as it thus does, a popular ground, it is a book which not only every physician who properly estimates the immense value of dietetics in therapeutics, but every educated person who wishes to retain his health, should possess and read. So far as we are aware, there is only one other scientific English work on “Food” in existence. (*Foods*, by Edward Smith, M.D., LL.B., F.R.S. New York: D. Appleton & Co.)

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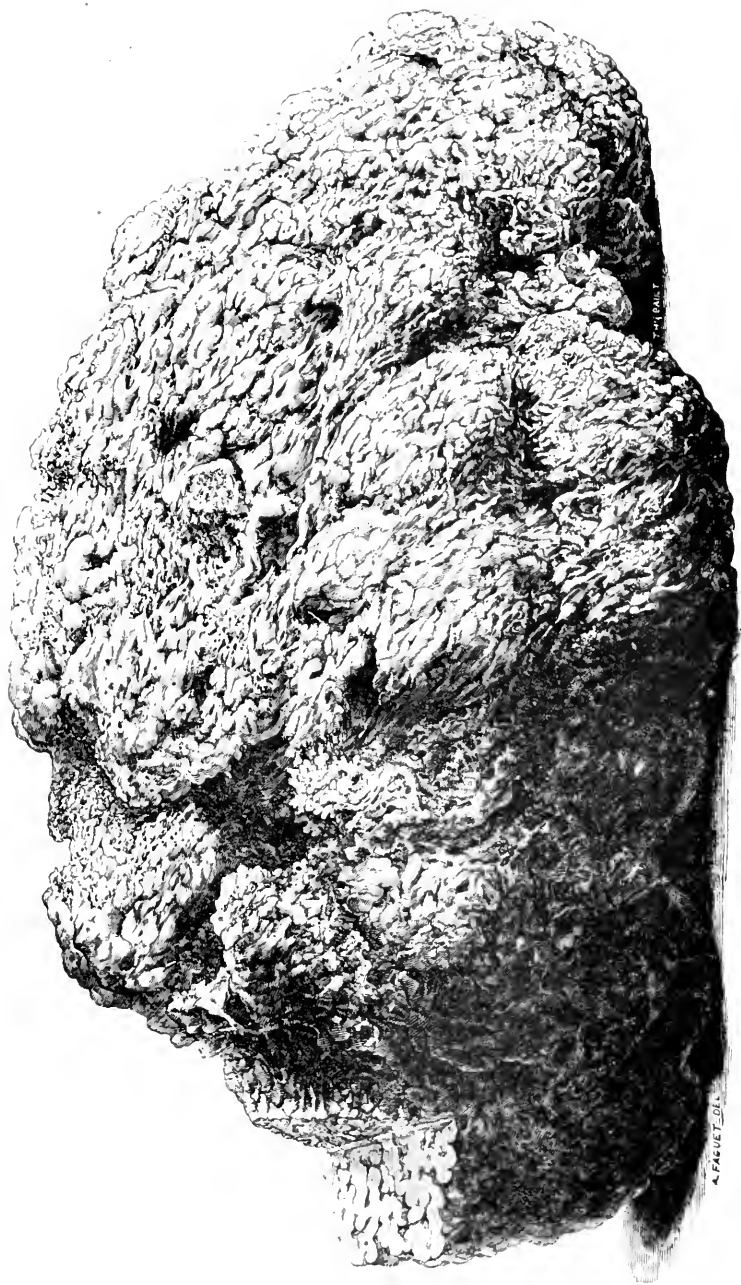


PLATE I.







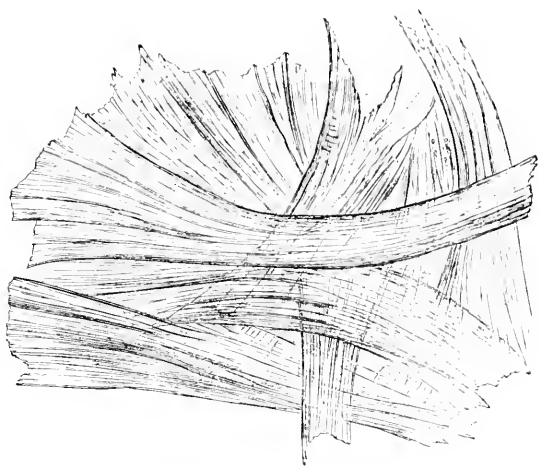


PLATE III.—FIG. 1.



PLATE III.—FIG. 2.





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AND

DISEASES OF WOMEN AND CHILDREN.

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## ORIGINAL COMMUNICATIONS.

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### HOW DO THE SPERMATOZOA ENTER THE UTERUS ?

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By JOSEPH R. BECK, M.D., Fort Wayne, Indiana.

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(Read before the American Medical Association, June 2d, 1874.)

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THE paper which I desire to present for the consideration of this section is a compilation of, first, a former paper on the same subject contributed by me, and published in the *St. Louis Medical and Surgical Journal*, in the number for September, 1872; second, some additional remarks in relation thereto, since added by myself, by way of interpolation of the original paper, but not published; third, a paper on the action of the os and cervix uteri during cohabitation, read by its author, Dr. Wernich, before the Berlin Medical Society, first published in the *Berliner klinische Wochenschrift*, in March, 1873, and kindly translated and republished in the same St. Louis Journal above referred to; and, fourth, a few additional remarks suggested by, and relative to the paper of Dr. Wernich. While I lay down as a foundation the division of this paper as above, I do not propose to so divide it practically. The first and second divisions, as named, will properly become but one in the discussion, while the rest may, for convenience, remain as they are. First and second, then:

The question which constitutes our subject is an old one, but one which has never been answered in a manner entirely satisfactory to my mind until now. Every author on gynæcology, obstetrics, physiology, anatomy, either normal or pathological, or in the department of medical jurisprudence, upon whose production I have been able to lay my hands, treats the matter in a vague and most unsatisfactory manner. Some pass by with remarks confined to two or three short sentences; while others take no notice of it at all; and thus, between indifference upon the one hand, and lack of knowledge on the other, we have not been making much headway in our endeavors to enter the secret penetralia of Nature, to unravel and wrest from her the intricate and mysterious process of procreation.

The reason for this apparent lack of attention on the part of the thinkers and observers in our profession, seems to me to be self-evident. It has heretofore been regarded as impossible, in the nature of circumstances, to ever be able to examine a vagina and uterus at the instant when the orgasm, which occurs during or just at the end of coition, affects these parts. This inability to observe must, of necessity, generally continue to exist; and we have heretofore been compelled to agree (though always under protest on my part), with the old idea that the spermatic fluid, upon being discharged in the neighborhood of the os uteri, remains thus situated a sufficient length of time to allow the spermatozoa to pass up through the external os, search the cavity of the uterus for the ovum, and even to penetrate to and through the Fallopian tubes in the prosecution of such search. In other words, a microscopic cell, with no internal construction that is fairly traceable, even under the highest attainable power of the microscope, possesses so much innate reasoning power, or, if you prefer the term, call it instinct, that immediately upon being deposited in the near proximity to its destination, it shall at once seem to become aware of the specific character of its mission, and, well knowing whither and in what manner to make its appointed journey, immediately bestirs itself in order to fulfil its destiny. In our days, many a spermatozoon must become disgusted at its unavailing efforts to find the object of its search, provided such a feeling is not incompatible with the very high grade of reasoning

power accorded to it by these old theories. I, at this time, regard any and all such explanations as exceedingly attenuated, as regards their thickness. After consulting the dictum of authority upon this matter, at least as much of it as is at this present writing attainable by me, I shall address myself to the demonstration of its utter absurdity, and undertake, in so far as I am able, after exposing its fallacy, to substitute therefor another and a very different theory, and one which I never saw broached anywhere until after the publication of my paper in 1872, which now constitutes part of this essay.

I take up first the line of demonstration followed by Gardner in explanation of this matter. Under the head of "*In what manner do these elements unite?*"<sup>1</sup> he states: "In the act of copulation the virile organ, in ordinary cases, penetrates into the vagina to the distance of from three to four inches, or to such a distance that the corona glandis, or extremity of the organ, is in immediate approximation with the opening of the uterine canal, the os uteri. Here the spermatie fluid is discharged.

"According to most physiologists, the active labors of the spermatozoon here commence, which accordingly, as if imbued with a knowledge of its duties, or pressed forward by instinct, commences to make its way through the patulous mouth of the uterus, into its cavity, and not finding the ovum there, prolonging its search through the length of the Fallopian tubes, even to the ovary itself. Some microscopists have recently asserted that they had seen the ovum just emerging from the ovary, already surrounded by the spermatozoa, rapidly moving round it and embracing it. . . .

"A popular opinion, but which has attained currency without foundation upon which to base it, that I am aware of, declares that in the act of copulation, at the time of the crisis, or height of venereal sensation on the part of the female, the mouth of the womb opens to receive the Danaean shower, and the spermatie fluid is injected immediately into the cavity of the uterus.

"So little is known of the os and cervix uteri in its minute anatomy, and its physiological action and sympathies, either in a healthy or a diseased state, that there may be some truth in this opinion.

<sup>1</sup> On Sterility, page 47 *et seq.*

"We may also account for the arrival of the spermatie filament in the uterus in some other way—by its specific gravity, the fluids of the vagina flowing back towards the uterus, while the female is in the recumbent position, during and succeeding the act. That this may be the popular theory, that procreation cannot be effected in a standing position, and that violent dancing immediately after sexual intercourse will prevent pregnancy, is worthily considered in this connection. . . . By whatever route the fecundating principle passes, it ultimately arrives at the ovary. Without much doubt, it is through the canal of the cervix, the uterus, and the Fallopian tubes. . . . As neither argument, nor corroborating, nor contradictory hypothesis can settle this matter, I shall leave the question with the mere statement of the two sides of the subject."

Thus much Gardner; and, in my opinion, it would puzzle any one to explain upon which idea he places the most reliance. It would seem that he has a few, and those very grave doubts, as to which opinion he shall be regarded as an expounder of, and, in order to avoid any unpleasantness, he seats himself fairly (to use a common metaphor) on the top of the fence.

Again, note how emphatically Kölliker speaks, when he says:<sup>1</sup> "As regards the movements of the uterus, they are, at all events during parturition, very energetic, but take place even at other times. . . . It is probable that movements take place at the time of menstruation, and in the act of congress, but the fact has not been ascertained. In the latter case, an opening of the os uteri, and a dilatation of the canal of the cervix, are commonly supposed to take place. If this is to be regarded as a spontaneous action of the cervix, it would be justifiable, with Kiwisch, to refuse assent to the supposition, for the radiating fibres described by Kasper, which alone could effect anything of the kind, do not exist; the fact, nevertheless, is conceivable, if we assume a relaxation of the muscular element in the cervix and os, together with a contraction, especially of the longitudinal fibres in the fundus and body."

Kölliker, as you observe, assumes that any movement on the part of or by the cervix and os, must of necessity be directly

<sup>1</sup> On Microscopical Anatomy, page 658.

controlled by the action of certain muscles, which he has been unable to find. *Ergo*, there is no such movement. Please to observe, also, that there is not the slightest reference on the part of this eminent anatomist to any possible part which the contraction and dilatation of the blood-vessels of the os and cervix might take in such a movement. Further along in this investigation, we shall see how that this very omitted action plays a most important part.

One sentence from Byford, in which the italics are my own, will serve to illustrate his theory on this subject sufficiently for all practical purposes.<sup>1</sup> . . . . Or the very thick, tenacious, albuminous fluid, which sometimes plugs up the os uteri and whole cervical cavity, may prevent the ingress of the spermatozoa, *which, by their independent motion, according to present belief, penetrate the uterus, meet the ovum somewhere on its passage to the os uteri, and produce their fructifying influence upon it.* . . . .

Since Byford attempts no elucidation of this matter in any way, I pass the quotation by, with the single remark, that in a the uterus, work on we might have expected some information, no matter how erroneous, on the particular point now under consideration. Perhaps this is, after all, only another instance of a halt between two opinions.

Just here, and for the purpose of exhibiting the medico-legal idea of the physiology of this matter, and to instance upon what slender foundations the superstructure of Law is sometimes reared, I introduce a quotation from Beck:<sup>2</sup> . . . .

It was formerly supposed that a certain degree of enjoyment was necessary in order to cause conception, and accordingly the presence of pregnancy was deemed to exclude the idea of a rape. Late writers, however, urge that the functions of the uterine system are in a great degree independent of the will; and that there may be *physical constraint* on those organs sufficient to induce the required state, although the will itself is not consenting. We do not know, nor shall probably ever know, what is necessary to cause conception; but if we reason from analogy, we shall certainly find cases where females have con-

<sup>1</sup> On The Uterus, page 59.

<sup>2</sup> Medical Jurisprudence, volume 1, page 238 *et seq.*

ceived while under the influence of narcotics, of intoxication, and even of asphyxia, and consequently without knowing or partaking of the enjoyment that is insisted on."

The point to be noticed and insisted upon most of all in the quotation just given, is the admission as a fact, legal though it be, that the locally applied stimulus of coition will, at any rate at times, force the uterus to act independently of the will. How well this position is taken by our very eminent authority we shall see further on.

In quick succession we refer to Rokitansky, Dalton, Hodge, Meigs, West and Tyler Smith for some attempt at an explanation of the process we are considering, and we retire in confusion at finding no pabulum in their works which may satisfy the craving of our mental stomachs for this sort of a meal. Tyler Smith, indeed, discourses learnedly, eloquently, and in the most practical manner upon the possible destruction of the spermatozoa by a leucorrhœal discharge, but touches upon the point we are examining nowhere nearer than to say:<sup>1</sup> "I have already referred to the normal mucous secretion of the canal of the cervix uteri, and which, in all probability, favors the ascent of the spermatozoa, or at all events permits them to move as freely as the mucus of the seminiferous tubes or the vesiculæ seminales. But in cases where a thick and highly viscid string of mucus is constantly exuding from the os uteri, we can easily understand that the ascent of the spermatie particles through the cervical canal may be impeded mechanically."

The fair deduction from this language seems to be, that the author quoted believes that the spermatie filament would pass up the channel of the cervical canal, and does so pass, of its own accord, provided that the resistance referred to is not very great, and that this filament has the power to overcome any ordinary obstruction which may be placed before it.

Carefully scanning Scanzoni's works, and finding nothing to reward us for our search, we pass on to notice what the pathologist Klob has to say in this connection. Those of you who have heretofore been disbelievers in the possession by the spermatozoon of peregrinating powers, which, but for want of a suitable arena, might rival a Weston, will be somewhat

<sup>1</sup> On Leucorrhœa, page 155.

astonished to hear our present author say: <sup>1</sup> "The rudimentary horn appended to the uterus unicornis may also become pregnant, even in cases where the junction with the normal one is solid, and therefore in those cases also where its canal neither communicates with the cavity of the uterus nor vagina; consequently, in such cases, to produce conception the semen must have penetrated through the normal horn and oviduct to the ovary of the opposite side from which the ovum entered the rudimentary horn in the usual manner." This from Klob, and the matter, in fact, as to the emigration of the spermatic filaments, may be speculated upon as you choose.

Another instance of a non-committal, non-explaining author, we find in Tilt, as by a reference we shall notice that he says: <sup>2</sup> "The chances of pregnancy are proportionate to the amount of semen entering the womb; and as, with well adapted organs, the orifice of the male urethra corresponds with the os uteri, the semen is, to a certain extent, injected into the cervical canal, and, whenever this occurs, the deadly collapse which follows connection may solve uterine spasm, and so dilate the os uteri as to facilitate the entrance of a portion of the semen in which it is bathed." . . . . . Certainly a most wonderfully constructed sentence. Not that I presume to criticise the language of the same, but merely state that if there ever was a single sentence written on any subject, which, by a fair inference, placed its author on both sides of the subject at once, then I have failed so far to meet with it. This is the way, of course, in which it presents itself to my mind.

Coming down now to the latest work comprehending the question which constitutes my subject, I am very properly surprised to find it dismissed from contemplation by as shrewd and careful an observer as Thomas, in a single paragraph, and in the following neutral style: <sup>3</sup> "In the act of coition, the male organ, being introduced into the vagina, projects into and against the cervix a fluid, consisting of a thick, watery portion, holding in suspension large numbers of ciliated cells which have the power of moving by ciliated action. The bulk of this fluid pours down into the vagina, but many of the cells which

<sup>1</sup> Pathology of the Female Sexual Organs, page 18.

<sup>2</sup> On Uterine Therapeutics, page 280.

<sup>3</sup> On Diseases of Women, page 613.

it contains pass upward into the body of the uterus." . . . . Comment is deemed entirely out of place here, the more particularly so since there is nothing to comment upon. Perhaps, when the author revises his work for another edition, he may be disposed to elaborate this whole subject beyond the limits of a single sentence, and may even devote a whole chapter to the explanation of the how of the passage of these cells. We will hope so, at any rate.

But now, permitting our array of authorities, who have testified to so little effect thus far, to stand aside, we will call forward another witness; one who is positive in his opinions, and who, after clearly enunciating them, proceeds in their defence like a crusader of old, with the difference that his pen is a much readier and more trenchant weapon than was ever the sword of the warrior. The literature of this part of the subject, scant as it has necessarily heretofore been, is therefore most appropriately dismissed by a rather copious quotation from him whom I believe to be perhaps unequalled as a gynecologist, and who is certainly the closest observer in this department that it has ever been my good fortune to read after. Indeed, words are powerless to express my admiration for his acuteness. So closely has he observed the physiology of this subject, *that he almost came upon the truth*; at any rate, very much nearer it than any other observer in the same premises, always excepting in all modesty your orator. Of course, I allude to and quote from Sims. Hear him!

<sup>1</sup> "We know very well that the semen, or rather its fructifying principle, the spermatozoa, must pass into the cavity of the uterus, if not further, in order to render conception possible. How is this done? Does it enter the canal of the cervix in the act of ejaculation? Or do the spermatozoa afterwards, by their locomotive powers, gradually wend their way up the canal of the cervix?

"I am not aware that any observations on the living subject have been before made upon this point. A few *post-mortem* examinations, made in cases of sudden death after coition, have demonstrated the presence of spermatozoa in the cavity of the uterus; but this does not settle the questions raised above.

<sup>1</sup> On Uterine Surgery, page 362, *et seq.*



The fact that pregnancy has frequently occurred without penetration, proves very conclusively that the spermatozoa can and do traverse the whole length of the vagina; that they then can and do enter the canal of the cervix, and passing along this narrow strait, that they can and do pass on until they reach the ovum and fertilize it. But this is not the usual way in which this is done.

"I have over and over again examined the condition of the uterus after coition, and often in four or five minutes after it; and I have usually found the state of things described on page 348. I have also frequently removed the mucus of the cervical canal immediately after sexual intercourse, first a drop from the os tincæ, and then a drop or two from an inch higher. If the neck of the womb is in a normal condition, with an open os tincæ filled with healthy mucus, we shall always find spermatozoa in it, in greater or less numbers, if we examine it immediately after coition.

"Thus we see that they enter the cervix, as it were, suddenly. My explanation of this physiological phenomenon is, that the cervix is pressed forcibly against the glans by a contraction of the superior constrictor vaginae; that this pressure necessarily forces out the contents of the canal of the cervix; that the parts subsequently become relaxed, the uterus returns suddenly to its normal condition, and the seminal fluid filling the vagina, necessarily rushes into the canal of the cervix, by a process similar to that by which a fluid would pass into an india-rubber bottle slightly compressed so as to expel a portion of its contents before placing its mouth in a fluid of any sort.

"If the uterus is in a normal condition, we shall always, as a rule, find spermatozoa in the canal of the cervix immediately after coition. If the uterus is greatly retroverted, we shall not; and if it is greatly anteverted, we shall not. And why? Because in the first instance, the os tincæ will be too close to the symphysis pubis, and if it is subjected to any such pressure as that alluded to above, it will, for anatomical reasons, be such as to compress the posterior lip of the os tincæ up against the anterior, which will have no effect in exhausting the canal of the cervix; and in the second instance, where there is a complete anteversion, with the os looking in the direction of the hollow of the sacrum, the same act and the same pressure would only

force the anterior lip of the os tincae up against the posterior, creating no vacuum, and making no room for the newly introduced fluid.

"From this it will be seen that I believe the cervix uteri to be shortened in the crethismal climax of coition, by pressure exerted upon it in the direction of its long axis, when its position is normal, which is impossible in any greatly abnormal position. I have spoken of a superior constrictor vaginae, and attributed to it a certain office—that of compressing the glans forcibly against the os tincae at a certain moment. I have made no dissections to prove the existence of such a special muscle; but that it does exist, and that some anatomist will dissect and describe it, I feel perfectly confident, for I have seen the manifestations of its presence hundreds of times. In uterine examinations, with the patient on the left side, and my speculum introduced, we may now and then see the posterior wall of the vagina, just opposite the os tincae, gradually contracted and corrugated, till it is brought almost in contact with the cervix, evidently by circular bands of muscular fibres that occupy the superior portion of the vagina.

"We are more apt to see this in patients that are alarmed, and manifest some degree of general nervous agitation. I have witnessed this over and over again, and what one man sees another will be sure to discover when his attention is turned in the proper direction. It matters not whether this explanation is correct or not, *provided other observers establish the fact that the semen finds its way AT ONCE into the canal of the cervix.*"

The italics in the concluding sentence are my own again, emphasized for what purpose we shall see as we make further progress in the consideration of our subject. Coming as our last quotation does, from a work devoted professedly wholly to the special surgery of the uterine region, I am forcibly impressed with the fact that in the anatomical and physiological views set forth in the quotation just given, we have received most agreeably much more than we had a right to expect.

I now pass from mere statements of theory, to examine some of the arguments which, in my opinion, affix the stamp of puerility at least, if not that of absurdity, to all the theories which have so patiently been hereinbefore advanced on the part of their several authors. We premise this further examination by

a repetition of the remark made earlier in this paper, that the cause set forth to account for the extreme scantiness of literature on this point, is, for obvious reasons, quite a sufficient one, and one which will continue ever to be more or less of an obstacle to our rapid advancement in knowledge of this matter, by reason of want of opportunity for observation.

Coming, then, to the argument, we inquire, do the spermatozoa ever arrive in the cavity of the uterus by their own efforts, and entirely unaided by any force other than that generated within themselves? I do not believe that they do or can, and I base my unbelief upon, first, their entire want of either reasoning power or instinct. That they are animated by no such power in the least degree, seems to me to be evident from their very construction. They are simply ciliated cells, with no internal formation which can be made appreciable under the highest power of the microscope. Lacking, therefore, the physical construction necessary to generate reason or instinct, we are forced to the conclusion that any idea which is advocated as affirming my interrogatory, must, in the nature of the case, be absurd.

I am a disbeliever, secondly, by reason of the lack of physical power exhibited by the spermatozoa. Any one who has ever observed these cells under the microscope, it would seem to me, must have become impressed with the remarkably feeble power exhibited by them; not feeble when considered by themselves exactly, but very feeble when regarded in connection with their prospective journey in search of the ovum. The movement of each cell, while a lively one in appearance, is yet indicative of a want of power which, according to my mind, would seem to be required to propel it to its destination.

I am an unbeliever for the third, and by far the most cogent and forcible reason of all, which exists in the fact that to a certain extent great opposition has to be overcome during and by the passage of these spermatie cells to the uterus; or further, by reason of the peculiar anatomical construction of the vagina and the cervical canal, not to mention here that of the Fallopian tubes. I do not propose to make the broad statement here that the uterus has *only one action*, but desire to be understood as saying that the only action that it is susceptible of, *that we have been familiar with so far*, is that of its contraction upon any contents, and therefore an expulsion, or an *effort*

at expulsion of any material which may occupy its cavity. This effort is manifestly aided by the direction of the action of the villi lining the Fallopian tubes, covering the mucous membrane which lines the cavity of the uterus, and continuing on to and covering the external os uteri, *this direction being from within outward, and the villi being placed point downward.* Now, with these forces and natural obstructions arrayed to oppose their passage, it occurs to my mind that any one who could believe, or even imagine, that *large numbers* of spermatozoa could generally, or even exceptionally, *by the use of their own inherent power solely*, gain even the cervical canal, to say nothing of the cavity of the uterus or the Fallopian tubes, must be guilty of a grave inconsistency, to say the least.

That this view of the matter has been entertained by others, and has been examined before, and that it has attracted the serious attention of very eminent authors, I have only to instance, and refer as proof to Montgomery, from whose writings I have not deemed it inappropriate to make a selection, bearing somewhat upon the point immediately under consideration, namely, the third section in my creed of unbelief, as stated. In speaking of the point where conception occurs, he says:<sup>1</sup> "It is much to be regretted that there should be in so many minds such a tendency to explain vital processes or functions by explanations based on mere physical or mechanical agencies, and, in fact, to be satisfied with no other; whereas all such modes of explanation are invariably found inadequate and unsatisfactory." This language contains an evident disapproval of all theories which do not admit that the process of conception is essentially a vital one, and that the function is in no respect purely physical. In this declaration—for reasons which will be made apparent hereinafter—I am glad to say I most heartily coincide.

But hear him further in this immediate connection: "It has been objected, and indeed it is one of Pouchet's principal arguments, that the natural peristaltic action of the Fallopian tube is from within outwards; and that, therefore, it cannot carry the semen from the uterus to the ovary. I think it would be equally just to say, *that as the natural peristaltic action of the*

<sup>1</sup> On Pregnancy, page 343.

*uterus and vagina is from within outwards, the semen deposited in the latter canal, or a portion, only at its entrance, could not be thence transferred inwards to the orifices of the Fallopian tubes.* Is not the natural action of the œsophagus to pass the food down to the stomach? But we know that in a large class of animals, it equally and as perfectly transfers it back again into the mouth for rumination. I know no reason why the Fallopian tube should not be equally capable of transmitting semen to the surface of the ovary, as of transferring an ovum to the uterus. . . . . Pouchet meets this unanswerable objection by saying that in extra-uterine pregnancy there is an aberration in the dispersion of the semen, which does not follow its natural course."

That a part of the above quotation contains matter that is irrelevant to the subject under consideration, I admit, and volunteer the statement that this matter was admitted in order to avoid any appearance of having made a garbled quotation. I have also italicized the concluding portion of the second sentence, merely to impress it upon your minds, as confirmative of the idea of the obstacles which are presented to oppose the entrance of the spermatozoa into the cavity of the uterus. Montgomery presupposes a reversal of action as the mode of carrying the semen up, and attempts to sustain his position by what I am pleased to denominate a very far-fetched comparison, and one which, even under the old *régime*, could not have been entertained for a moment by any competent anatomist, by reason of the vast difference in the anatomical construction of the two tubes thus ill-advisedly compared. Beside this, the returning action of the organs concerned in alimentation in the ruminantia, does not reside in the gullet solely, by any means; for Flourens ascribes the formation of the pellets which are thus returned, to the action of the muscular duct which connects the gullet with the reticulum and psalterium, and the power which the animal has of closing or opening at will the orifices of these cavities. Hence the term far-fetched is appropriately applied to Montgomery's comparison.

But returning and retracing our steps, we are led to ask, how, then, *may* the ascent of the spermatozoa be *aided* in exceptional cases, by the organs concerned in generation? It might be suggested as a partial reply to this question, that owing to the

intense excitement under which all of these organs are laboring during coition, and more especially at the height of the venereal orgasm, they *might* somehow *reverse* their action, and that under cover of this reversed action, a few spermatozoa might be *aided* in their journey to the cavity of the uterus. This theory would exactly coincide with that of Montgomery, in that it would be classed as a vital process, but surely there must some confusion ensue when the same author would class it with the purely physical function of rumination, as already mentioned.

This suggestion might cover some exceptional cases, and I do not propose to become so exceedingly illiberal as to entirely exclude the idea from all consideration, but will for tolerance sake admit the existence of a few such rare instances. I will even go further, and agree with Montgomery that this theory will patch out beautifully, and can be made to cover *all exceptional cases*; but, dealing as we are with rules and generalities, I beg to submit that the idea as above inculcated, *will not do for a rule, much less for a general explanation*. As the observant Sims has better said: "THIS IS NOT THE USUAL WAY."

But just here I may be met by the assertion, that the only way in which the persecuted spermatozoon could by any *possibility* obtain relief from all its troubles, and secure a conveyance into the uterus, *must of necessity* be elucidated by some one, or a combination of more than one of the ways and means which have already been discussed. To such an assertion, if made, I here submit a total denial. I am now, and have for a long time past been certain that no single one of the modes made mention of and advocated by any of the reputed authorities on the subject, nor any possible combination of them, ever has or ever can be made to explain that process in a perfectly rational manner.

The only way in which this subject can be positively set at rest, and determined for all time to come, is to observe the action of the os and cervix uteri *during the sexual orgasm*. I have made two such observations, and know beyond the peradventure of a doubt, that all the descriptions of the modes of entrance of the spermatic fluid into the uterus, heretofore or hereinbefore described, are totally and wholly, both in the main and in detail, theoretically and practically untrue. This may

be deemed to be a broad and sweeping denial, one which is very positive in its assertions, and which will admit of but one interpretation; nevertheless, gentlemen, I mean it just as it has been said in your hearing, and I am glad to be able to call attention hereinafter to Dr. Wernich's views as compared with mine, and am even better pleased to have this broad denial sustained in every particular, by as competent a gynaecological observer as my friend Dr. M. A. Pallen, of St. Louis. Of this, however, more anon.

What the *real* force and the *real* state of affairs is, which compasses the end which we are contemplating, remains yet to be described; and we find ourselves, if the truth has been spoken thus far, reduced to the extremity of again asking the question which stands as the subject of this paper: "How, then, do the spermatozoa enter the uterus?"

I answer this question in a positive manner, by a description of what I saw, and in what manner and under what circumstances I saw it. Since two observations, yielding each time the same results, were made within twenty-four hours of each other, a description of one will fairly represent the net results of both, give us as accurate details as a second one could, and spare me some trouble. I take from my case-book a *verbatim* description of the case as presented to me at the first consultation, and detail the observations which were made at the second examination.

"August 7th, 1872. Mrs. H. L——, married, living with her husband; aged 32 years; of very strongly marked nervous temperament; blonde, married eight years; has one child living, seven years of age; has had one abortion; last pregnancy was six years ago; commenced to menstruate in her fourteenth year; present illness has existed six years, dating evenly with abortion; symptoms which have been apparent during its course, were dragging and weight in pelvis, more or less pain in back and loins, some vesical and rectal irritation, inability to walk without great fatigue, inability to lift weight of any moment, some leucorrhœa, and a sinking sensation referred to the epigastric region; cause of all this trouble supposed by her to be a "falling of the womb;" present condition as regards menstruation, menstruates regularly every twenty-eight days, normal as to amount, and has no dysmenorrhœa; leucorrhœa slight as

to amount, is constantly present, is white, glairy, and unmistakably uterine in its character, and is nearly neutral in its reaction; pain is intermittent, by no means severe, and is principally referred to the back, loins, inguinal and sacral regions; locomotion is impeded to a considerable extent by the consequent fatigue; as to other symptoms she suffers severely from habitual constipation, and has had for four or five years a persistent eruption of acne upon her face; of physical signs, the touch shows the os uteri just inside the vulvæ, the speculum was not used, the probe shows the pelvi-uterine axis to be considerably changed, but no flexion of the uterus present, the probe entering the cavity two and one-half inches; diagnosis, prolapse of the uterus in the second stage; prognosis, a complete relief of all the symptoms, and in time a perfect cure; treatment, mechanical support to the uterus by means of a McIntosh stem pessary, and internally ferruginous and bark tonics, iodide of potassium, and Fowler's solution of arsenic."

Thus much for the history of the case as compiled from an office examination; and I desire to stop here long enough to remark that the result of the treatment was all that could have been desired; the prolapse is entirely relieved, although the supporter has been until very recently still worn during the day, and my latest advices from my patient, received while preparing this paper, was to the effect that she was then seven months advanced in her third pregnancy.

Returning from this digression, I continue my statement. In making my visit at the residence of the patient, next day, for the purpose of adjusting the supporter, I made a second examination by the touch, and upon introducing my finger between the pubic arch and the anterior lip of the prolapsed cervix, I was requested by the patient to be very careful in my manipulation of the parts, since she was very prone, by reason of her nervous temperament and passionate nature, to have the sexual orgasm induced by a slight contact of the finger, a fact which I believed had been manifested in my office examination of the previous day, and which she afterward admitted had been the case. Indeed, she stated further, that this had more than once before occurred to her while making digital investigation of herself. Here, then, was an opportunity presented me to make a second observation, under vastly more favorable circumstances



than had accompanied the first; an opportunity never before, in so far as I knew, afforded any one, and a chance for clearing up the hitherto regarded unknown and unknowable, which in my opinion was not to be lost under any consideration. Carefully, therefore, separating the labia with my left hand, so that the os uteri was brought clearly into view in the sunlight, I now swept my right forefinger quickly three or four times across the space between the cervix and the pubic arch, when almost immediately the orgasm occurred, and the following is what was presented to my view:

The os and cervix uteri had been about as firm as usual, moderately hard, and, generally speaking, in a natural and normal condition, with the external os closed to such an extent as to admit the uterine probe with some difficulty; but instantly that the height of the excitement was at hand, the os opened itself to the extent of fully an inch, as nearly as my eye could judge, made five or six successive gasps, as it were, drawing the external os into the cervix each time powerfully, and, it seemed to me, with a regular rhythmical action, at the same time losing its former density and hardness, and becoming quite soft to the touch. All these phenomena occurred within the space of twelve seconds of time certainly, and in an instant all was as before. At the near approach of the orgasmic excitement the os and cervix became intensely congested, assuming almost a livid purple color, but upon the cessation of the action, as related, the os suddenly closed, the cervix again hardened itself, the intense congestion was dissipated, the organs concerned resolved themselves into their normal condition, and their relations to each other became again as before the advent of the excitement.

In reflecting upon these facts, since the publication of my paper in 1872, the idea has taken possession of my mind that the application of my finger to the os, to determine its consistence during the crisis, exercised, perhaps, no small influence in abridging the duration of the orgasm. Particularly has this impressed me, by reason of the statements of the patient, which we shall presently notice. Another item which I have thought a great deal about since these events transpired, is the rhythm which marked the movements of the os and cervix. It now occurs to me that this rhythmical action might have been

synchronous with the action of a greatly excited heart, and this impression is especially deepened when the great attendant congestion is remembered; but as this idea is contemplated in the presence of a very lucid theory, I may be under the impress of the idea to too great an extent to be enabled to judge impartially. However, we will discuss this matter further along.

Returning from this apparent wandering, and resuming the thread of my narrative, I remark that I carefully questioned my patient as to the nature of the sensations experienced by her at this period of excitement, and she is very positive that they were identical in *quality* with those experienced by her during coition, even before the occurrence of the prolapse; but she admitted that they were not exactly the same in *quantity*, believing as she did that during coition the orgasm *had lasted longer*, although in no respect different as to the character of the sensation.

When in connection with these statements of the patient, who is a very intelligent and appreciative lady, I adduce the experience of her husband, who, since the preparation of my first paper, has assured me that prior to the observations of which I had written, he had, by frequent examinations, noticed what he now knows to have been the actions above described; and when to all this I add my own statement to the effect that there was no inflammation of any kind present anywhere, either in the os or cervix uteri, the vagina, bladder or rectum, and that the parts were in an entirely normal condition in every respect, except as to position, I am certain that no idea of presumption on my part will be entertained when I close this paragraph with the remark, that in the observations just described I then and there had exhibited before my eyes the phenomena which are always present during coition; and the passage of the spermatic fluid into the uterus is explained fully, satisfactorily, and in every way beyond the shadow of a doubt.

I do not doubt that many of you have at some time seen in small streams of water, a species of fresh-water fish, improperly denominated, in the United States, the "Sucker," but which in fact is not one of the Discoboli, but, on the contrary, comes under the class of *Cyprinus Carpio*, and is a member of the

family Cyprinidae. The peculiarity of this fish is its long, pendulous upper lip, and small round mouth. When at rest in the water, they aerate their blood in the way common to all fish, with the additional peculiarity, when they pass the water through the mouth and out at the gills, of making a suction motion with their mouths, in or during which the overhanging lip is to a considerable extent inverted into itself. This action can be readily noticed when the fish is stationary under the shade in the water, and is peculiarly apparent on a very warm day. Precisely such a motion does the lower segment of the uterus make at the height of the sexual excitement.

The quarter from which my illustration is drawn, I feel stamps the comparison as a very homely one, but I am aware of no other operation in Nature, or in the movements of any of Nature's creation, which answers my purpose quite as well; and I may therefore be pardoned for having illustrated a vital action by a comparison with one essentially physical.

To condense the explanation of the passage of the spermatozoa to their destination, into a single sentence, we shall say that the act of coition, *purely mechanical in its nature*, arouses some special nervous action in the uterus, *entirely vital in its nature*, which causes that organ to act as already described. Perhaps we may properly amend this by saying, *forces that organ to act, etc.* I am now of the opinion that the movements of the os and cervix uteri herein delineated, are directly the result of the force exerted through the media of the nervous system, and that they are only indirectly promoted by the mechanical action of coition. I also believe that the great nerve centres have, to a greater or lesser degree, the control of the matter, ascribing to the nerves of volition a lesser degree of such power, but by no means denying to them *some* agency therein. This theory is not at this time demonstrable, and therefore is only suggested as an opinion. The views presented in connection with the facts throughout this paper are, of course, in a crude condition as yet, and will well bear discussion and further observation; but I feel sure that the facts stand for something, and that they offer to the profession the first and only reasonable solution of the question, "How do the spermatozoa enter the uterus?"

We shall now properly endeavor to cast as much light as possible upon that at present unknown power, which, by its direct action upon the os and cervix uteri, causes those movements by them which we have been considering. We have seen in what manner the os and cervix have been dilated, and how the process is continued to its completion by the admission of the spermatozoa into these cavities; but the desire is yet strong within us to go one step further, and investigate the character of the force or forces which have been chiefly instrumental in bringing this to pass. This brings me now to the consideration of the third division of my paper, namely, the monograph "ON THE ACTION OF THE OS AND CERVIX UTERI DURING COHABITATION," by Dr. A. Wernich, of Berlin, Prussia.

It is but proper to remark, as a preliminary to the introduction of this third section, that it is impossible for various reasons to give more than an abstract of the valuable points made by Dr. Wernich in this paper, since its complete rendition here would involve the extension of my paper to an immoderate and excessively tiresome degree; since all that is of real or comparative value is embodied in the abstract; since the paper in its entirety is of a nature rather metaphysical than practical; and finally, since the translator has not deemed it necessary, for a full understanding of the paper, to give more than an abstract. I reproduce this abstract, then, from the *St. Louis Medical and Surgical Journal*, for February, 1874.

"In considering this subject before the Berlin Medical Society, Dr. Wernich maintained that, although in late works upon the *cervix uteri* it is held that this portion of the uterus is almost without nerves, and, in the various activities of the organ, remains an inactive appendage, yet, on the other side, a series of investigations which have widened the older views makes it much more probable that just this portion of the uterus plays a very important rôle in certain phases of sexual life. Vallisneri and Haller directly observed the process of erection in the uteri of animals. Günther states that in the mare the uterus exercises an aspiratory activity during and after the ejaculations. Bischoff, after his experiments on dogs and rabbits, felt justified in assuming that the human uterus, at the moment of the highest excitation, presses down into the small basin, and that the mouth opens and draws the semen in by

suction. Still, there was generally little inclination to accept the analogy from the lower animals, even after Ronget published his investigations concerning the dilatable vessels of the human uterus, and Litzmann, and, soon after, Hohl, observed the erection of the uterus direct through touching, and Eichstedt, from these data and his own experience, framed a full erection and aspiration theory. According to this theory, the uterus, which is flattened antero-posteriorly in its usual state, assumes a roundish or pear shape during and especially after the sexual excitation in coition; so that an actual *carum uteri* arises, and through this temporary widening the semen is drawn in.

“A year before the date of these remarks, in a full and detailed publication of two observations of uterus erection, Dr. Wernich took occasion to oppose this view, and especially supported by the results of Henle’s anatomical investigations, he sought to establish the probability of a somewhat different process. He believed that as with man an erection of the penis, so in woman a similar erection of the *os and cervix uteri*, and of this only, takes place, and that at the time of the orgasm and almost simultaneously with the mutual ejaculation, the *cervix* becomes lax and soft, the *os* opens, and through this somewhat sudden cessation of the previous state, rendered possible by the peculiar arrangement of the vessels, the aspiration occurs. Furthermore, he had received friendly letters from Dr. Matthews Duncan, of Edinburgh, and from Professor Bischoff, of Munich, communicating statements in the literature of the subject overlooked by him, and remarks wholly in agreement with his views. Under these circumstances, he felt he might be pardoned for coming before the Society with a further confirmation of his views of normal conception, namely, the direct observation of these changes in the *portio vaginalis* by Dr. Beck, reported in the *St. Louis Medical and Surgical Journal*, September, 1872, under the title: ‘*How do the Spermatozoa enter the Uterus?*’”

Dr. Wernich was ready to retain doubts, as far as need be, in single observations; but aside from the fact that the author made the observation the second time, there was much in the report to contribute to its credibility. Dr. Beck was entirely unprejudiced with regard to what he saw. His *nüiveté*

went so far that he knew nothing of the European literature, *pro et contra*, and held his observations not only as the first *per aspectum*, but as something absolutely new. However valuable though this absence of all preconceived opinion may be, it had, on the other hand, the disadvantage that the reporter had given no strict thought as to how the fact he saw came about. To Dr. Wernich, this initial hardness of the *cervix*, the congested state, and the rhythmus of the aspiratory movements, are certainly evidence in favor of the view that the confirmed phenomenon rests on a process of the vessels. There are peculiarly constructed vessels, capable of contraction and dilatation, found only in the *cervix*. Wholly at variance with Rouget and Ducelliez, who describe the whole uterus as capable of erection, and thereupon proceed from a somewhat hypothetical representation of the *arteriæ helicinæ*, and their functions, and who do not, in their whole works, describe a single vascular apparatus which, *stricto sensu*, merits the title erectile, Heule establishes beyond doubt the right of the vessels of the cervical and vaginal portion to this designation. Dr. Wernich had spoken in full concerning this matter in his publication alluded to, and to avoid repetition, he referred the Society to it and to Heule's "Hand-book of Anatomy."

Since the above abstract of his last paper has been incorporated into this essay, Dr. Wernich has kindly sent me his "former paper," etc., alluded to in the abstract; and I feel that the subject matter of the paper thus transmitted to me is of such an important nature that I have taken the liberty to transgress still further upon your time and patience, and have reproduced it in its entirety. The subject is by this paper very aptly and appropriately closed, in so far at least as I am able to carry it at the present time; and this paper would really be incomplete without the rendition of this last addition to the literature of the subject. It will be remembered that the paper, now about to be introduced, was read early in 1872, and about one year prior to that which we have just given, and thus claims precedence over my original paper of some few months at any rate. Deferring any remarks upon Dr. Wernich's theory for the present, I proceed to give you his paper "ON THE ERECTILE PROPERTIES OF THE LOWER SEGMENT OF THE UTERUS AND ITS SIGNIFICANCE."

“Among the many observers who have from time to time directed their attention to the erectile organs of the female, I may prominently mention the French anatomist Rouget, who, in an elaborate monograph on the subject,<sup>1</sup> has described not only the clitoris and the Fallopian tube, but also the whole uterus, as being possessed of erectile qualities. His investigations relative to this point, which originally had their origin in some other investigations having for *their* object the study of the helicine arteries, have evidently been held in higher estimation by anatomical authors than by the authors of works upon gynaecology. I thus conclude, from the fact that he is not referred to in any of the works upon the latter subject which are at present at my command, excepting in the volume on Sterility, by Marion Sims, and in that on Diseases of Women, by Dr. Grailly Hewitt; nor can I find that his discoveries have been made use of, in any of their peculiar phases, by the authors of any special papers having reference to this branch of the subject.

“The assertions of Rouget, in so far as they relate to the present subject, were to the effect that the uterus was, both as to its body and to its neck, an erectile organ, and that it exhibited its erectile property *only* during ovulation and menstruation. I believe that I shall be able to substantiate the fact, that while in one respect these views are correct, and capable of still further extension, they are in other respects more or less incorrect, and should be subjected to considerable restriction.

“I had endeavored for a long time to gain some light as to the *modus operandi* of the phenomena present during the erection of the uterus, but I have looked for it in vain in and during vaginal examinations, which I have made in large numbers upon the inmates of the extensive and numerous-attended wards of lying-in hospitals. The patients in these wards, upon whom the examinations were made, were, as a general thing, too far advanced in pregnancy to yield anything like a satisfactory result, and even in occasional cases, when the cervix uteri did seem to elongate and harden itself in response to the touch of the investigating finger, still the impressions received under these circumstances were of a very vague and indistinct character.

<sup>1</sup> Journal de la Physiologie, volume 1, page 320, *et seq.*

"During an investigation upon a case in which I was recently engaged, I made an observation which I briefly communicate here, which taught me, however, that such observations of the condition in question are possible even in pregnant women, and when carefully considered may become of practical importance. The case is as follows: Mrs. E——, 24 years of age, of very robust physique, and recently married, was suddenly attacked with very severe pains in the abdomen. In the opinion of the patient, she was about three months advanced in pregnancy, and volunteered the further statement that she had received a severe injury only a few days before. A careful exploration of the generative organs revealed the uterus in a normal position, and affairs generally in a proper condition in and about the genitalia; but I was surprised to notice a very remarkable action on the part of the cervix uteri while making my investigation. In the beginning of the exploration, while the abdominal pains seemed to be very severe, which I inferred was the case from the actions of the patient, yet as the examination progressed these pains seemed to lessen materially, both in degree and in duration. The cervix uteri, being that of a primipara, had, of course, not as yet lost its virginal shape and size, and it at first presented itself of a moderate length, easily movable laterally, and, on account of the moisture of the mucous membrane, quite soft to the touch. When, however, the pains ceased, and while I was yet engaged in interrogating the adjacent pelvic organs, the cervix suddenly became elongated and quite hard, and the mucous membrane covering it became distinctly movable upon or over a substratum of hard tissue; in short, the cervix was in a condition of erection.

"I cannot compare the impression I received from the cervix while in this condition, with anything else than the glans penis when in a state of erection. In this patient the change in condition from the soft to the hardened cervix could be produced at pleasure at every examination. Her opinion as to the existing state and time of her pregnancy, was in due course of time verified.

"I have for a long time been of the opinion that this phenomenon might be quite often noticed incidentally: yet a number of celebrated observers, especially noted for their shrewdness, have informed me that such action on the part of the cervix



uteri is not often developed to such a marked degree as to attract the attention of the observer, who being intent on other matters of detail, might easily pass such action by unnoticed. In my opinion, the explanation of this fact is principally to be found in the other fact, that the sexual excitement is in the generality of cases repressed as much as possible by the patient; nevertheless, if the patient be possessed of such an excitable temperament as to be unable to successfully repress these feelings, the changes in the erectile organs, which are now under consideration, are frequently produced by a mere sight by the patient of the preliminary preparations for an examination; so that it happens in the large majority of these excitable cases that the explorer finds the cervix uteri already in a state of erection.

“In Hohl’s work<sup>1</sup> we find a statement made, according to the tenor of which we are given to understand that this process itself had been fully observed. The statement referred to is as follows: ‘It, however, rests not indeed upon any error, but upon observations repeatedly made and often verified, when we make the statement, that in irritable females, especially quite plainly in those who have not as yet borne children, there occurs during the increased irritation ordinarily attending a vaginal examination, not only a material increase of the vaginal secretions, but also a momentary sinking down of the uterus, and an opening of the os, so that it does indeed become, to all intents and purposes, an os tinæ.’ More than this, we find that Litzmann relates his experience in the following words:<sup>2</sup> ‘I myself recently had occasion to observe, while examining a young and very excitable female, that the uterus suddenly took on a vertical position, and sank down into the cavity of the pelvis; that the mouth of the womb became of an equal length all around; that the os became rounded, softer, and more easily entered by the exploring finger; and that at the same time the high grade of sexual excitement under which the patient was laboring, manifested itself in her hurried respiration and tremulous voice.’

“In the case of Mrs. E., which I have detailed above, no other sign of sexual excitement was apparent except those already related.

<sup>1</sup> *Lehrbuch der Geburtshilfe*, page 125.

<sup>2</sup> *Wagner’s Handwörterbuch der Physiologie*, volume 3, page 53.

"Just at this point I will relate an observation which, in its salient points, is quite in accordance with that made by Litzmann, and in which this phenomenon manifested itself quite plainly. It occurred in the case of a servant-girl, who was thirty-five years of age, who had borne one child when she was about nineteen years old, and who at the time of this examination was suffering from a slight retroflexion of the uterus. The uterus, after her labor, had undergone involution so fully and completely that the cervix uteri, with the single exception of a certain increase in volume, presented almost the form of that of a virgin. In the commencement of the examination I noticed that the patient, by the exercise of quite a strong effort, forcibly restrained her feelings, but as the investigation required to be extended over a considerable time, there eventually occurred, in addition to the other signs of strong sexual excitement, full and complete erections of the cervix uteri; so that while it was formerly soft and flabby, it now presented itself as a hard body, about as long and twice as thick as my thumb. Repeatedly, during the examination, the organ returned to its original condition, and again and again it re-erected itself as described.

"It has been the design, as must have been evident all through the statements set forth up to this time in this paper, to speak only of the erectile power of the lower segment of the uterus, for the specific reason here plainly stated, that I am firmly fixed in the opinion that the condition to which the term erectile can be rightfully applied, manifests itself, and indeed occurs in this lower segment *only*, and not in the whole uterus. This view, it seems to me, rests upon a very good anatomical basis. It is true that Rouget attempts to demonstrate that the uterine arteries, in their upward course, send or give off to the cervix only their first branches, and that these are of very insignificant calibre; and that when the trunks of the main arteries arrive at a point opposite the body of the uterus in their course, they directly give off from twelve to eighteen short branches, which, after a short, and it is said a spiral course, divide themselves again into an indefinite number of smaller branches. Reasoning from this fact alone as a basis, Rouget is of the opinion that the body of the uterus is the portion of that organ most profusely supplied with arterial blood; and he

further lays claim to have been enabled to follow these 'spirals' up to the point of their termination in the great sinuses of the uterine walls. That this description is correct in the main, and that the vessels so described are capable of supplying to the body of the uterus the great amount of blood so necessary to its general well-being under all circumstances, can and should be readily admitted. We miss, however, in these representations of Rouget the description of such a class of vessels as are absolutely characteristic of an erectile tissue. This, to my mind, fatal defect in the above author's description, I find fully and satisfactorily supplemented, especially with relation to the cervix uteri,<sup>1</sup> in Henle's larger "Anatomy," where he states:

"An arrangement quite peculiar to itself, and entirely different from those which may be found in the body of the uterus, is represented in those blood-vessels which supply the cervical and vaginal portions of that organ with blood. While the vessels situate in the soft superficial layer of the mucous membrane of the body of the uterus attract one's attention by reason of the attenuation of their walls, the arteries and capillaries of the cervix and os are especially noticeable for the great relative thickness of their walls. In the finer, or rather in the smaller vessels, whose transverse diameters do not exceed from one one-hundredth to four one-hundredths of a millimetre in diameter, we find that when uninjected and undilated they have a calibre of only one-third of that amount. In arteries measuring three-tenths of a millimetre in diameter, we find that the dimensions of their walls as to thickness are only six one-hundredths of a millimetre. In veins of fifteen one-hundredths of a millimetre in diameter, the walls are only two one-hundredths of a millimetre in thickness, and it is principally the circular muscular coat of these vessels which accounts for the major part of this thickness. Equally peculiar and striking with the structure of these vessels, is the course which they take in their distribution. In the muscular layer of the os uteri a number of small branches arise from the main arteries, and, pursuing a course parallel with each other and slightly serpentine in character, and almost equidistant from each other all around, run almost to the surface; and immediately beneath the surface a number of venous branches, which are

1 Handbuch der systematischen Anatomie des Menschen, page 463, *et seq.*

of a relatively large size, have their origin, and these vessels penetrate the walls in a course parallel with that of the arteries, and in the same regular order. The capillary vessels, through or by means of which the distal ends of the veins and arteries are brought into connection, are placed immediately beneath the epithelium, and penetrate the papillæ of the mucous membrane in loops. In the rugæ of the cervix the general course of the vessels is also vertically directed towards the surface. A horizontal section of the mucous membrane gives us a clear transverse view of the sinuses, surrounded by transverse sections of the vessels passing through the interspaces between these sinuses.'

"And further on, in remarks upon the physiology of the matter, we notice statements by the same author to the effect that: 'The reason why these vessels should be possessed of a relatively greater power of resistance is not readily apparent, inasmuch as they have no special amount of pressure to endure that I am aware of, and particularly inasmuch as they are fully and sufficiently protected from any undue or over-distension of their walls by the density of structure of the tissue in which they are situated. *Where, in order to produce contraction, unusual means are applied, there also we know that uncommon relaxation and dilatation is possible.*'

"In addition to the quotations already given, I desire further to notice a remark of the same author's, which has peculiar reference directly to the possible relation which might subsist between the curious construction of these blood-vessels and the mucous secretion: '*but the changeable degree of contraction in the smaller vessels might serve to furnish the cervical and vaginal portions of the uterus with a sort of erectile faculty, or a certain facility for congestions and swellings.*'

"I believe that I would be unable to plead for my own views with greater advantage, even by means of self-made investigations, than has been done just here, and in the already quoted words of the great anatomist. When, therefore, as has been demonstrated, we know that in the upper portion of the uterus the anatomical basis of a true erection is absent, it should, I believe, be readily admitted that in the physiological conditions which we will presently notice, an increase in the volume of the walls of the lower segment of this organ is not

only possible, but for the normal performance of certain functions is highly probable.

“To ascertain the condition of the upper portion of the uterus during an erection of its lower segment, either by pressing it down from above through the abdominal walls, or by the introduction of the uterine sound, or by means of both plans used in conjunction and at the same time, is, I think, very difficult.

“The explanations which I have just presented, had, of course, for their objective point the fixing of certain limits to the erectile powers of the uterus, and to restrict them to those certain portions of that organ which were determined by anatomical considerations. In a physiological point of view, however, the discoveries and observations of Rouget seem to require an essential extension of area. He claims that erections of the uterus occur during the period of ovulation only; but Grailly Hewitt goes one step further in making the statement that ‘erections occur also during sexual intercourse.’<sup>1</sup> The examples which have occurred in my own cases, and in those of others, and which have already been related, seem to indicate clearly that the erection of the lower segment of the uterus is brought about in the same manner as that of the penis, by means of any considerable sexual excitement, even when cohabitation is not had; but under these circumstances it rarely attains a high degree, and recedes in common with the other symptoms of excitation, such as a peculiar sigh, a flushing of the face, a bright moist glittering of the eye, etc. While during ovulation this erection, as aforesaid, only accompanies the other menstrual processes by necessity, it is manifested during cohabitation not only in its highest degree, but, in my opinion, it is an essential, and in all probability the main factor in the process of impregnation.

“At first glance one might readily imagine that the cervix uteri might erect itself for the purpose of forming with the penis the so-called celebrated ‘continuous canal’ between the two sexual systems. It is well known that the contact of the glans penis with the os uteri is no very uncommon phenomenon; but it is also an equally well-known fact that this connection exists only in the form of short, jerking contacts, very

<sup>1</sup> On Diseases of Women, page 25.

similar, as to duration, to those made by successively opening and closing an electric circuit, owing to which fact a continuous contact, or one of considerable duration, is entirely out of the question. There exist, as I happen to know for a certainty, a number of happy husbands, with quite numerous progeny, who have never experienced even these transitory contacts with the os. The theory of the continuity of the canals of the two sexual systems, even as it is referred to and explained in some of the later text-books on Physiology, is rendered so extremely doubtful by the large number of both old and recent observations on the other side of the subject, that I desist from introducing any further evidence of their or its extreme improbability.

"We may now with the greatest propriety inquire for what purpose, then, has the lower segment of the uterus been endowed with erectility? I reply, in the first place, for the purpose of ejaculation. The fact that at the height of the orgasm there is ejaculated on the part of the female, and from the uterus, a fluid, has been known for a long time, and numerous observers have from time to time called attention thereto. This fluid is generally mucous in its character, small in quantity, of an alkaline reaction, and of a high temperature. I say generally, for the reason that there are exceptional cases, where, when the orgasm occurs in individuals who possess certain very voluptuous temperaments, this fluid is said to pour forth from the os uteri in quite considerable quantities. This fluid, as we all know, consists of the secretions of the cervical glands. As to the origin and the mode of manifestation of this secretion, I may be permitted to again quote from Henle. He says:<sup>1</sup>

"Inasmuch as the mucous membrane of the cervical portion of the uterus is the point where is secreted that transparent viscid mucus which fills that portion of the uterine cavity, as often as there exists a cavity by reason of a separation of the walls of the cervix, and since there is no other glandular structure found in this membrane, we are compelled to regard the sinui which exist in this membrane as a species of mucous follicles, although they differ considerably in structure from the ordinary secretory and glandular organs. Whether the muscular structure of the blood-vessels of the cervix is in any

<sup>1</sup> Loc. cit., p. 464.

way concerned in this function of the mucous membrane, is very difficult to establish. The formation of this secretion, however, depends, in all probability, upon a relaxation of the vessels just mentioned, and the contracted state of these vessels would in a certain degree fairly correspond to the period of inaction, during which the secretion is always suspended.<sup>1</sup>

“After the formation of an appropriate quantity of the cervical mucus, which is presumably effected by the dilatation of the cervical blood-vessels during erection, it is ejaculated from the cervix at the instant that the relaxation occurs which has been suggested by Henle, and which we propose to further discuss presently. This secretion of the cervical mucus may become chronic, and when such a state of affairs exists, there is formed an oblong or pyramidal plug of a viscid gelatiniform consistence, which protrudes from the os uteri in the form of a stringy and slimy mass (*ein Schleimstrang*). Kristeller, who is the originator of this term, has examined this pathological formation closely in an elaborate essay,<sup>1</sup> and has undertaken to establish for it an essential part in the processes of copulation and conception. Marion Sims also declares that the presence of this viscid mucus plug in the os uteri is by no means unknown to him. We must be careful, however, not to neglect to notice the fact that the large majority of Kristeller's investigations were made in and upon the bodies of invalids; and although one may with profit follow the ideas and reasonings of this author on a few special points, particularly those ideas having for their object the investigation of the conservative properties of this secretion in relation with the spermatozoa, yet his final hypothesis remains wide open to the imputation of improbability. This hypothesis assumes that the spermatozoa enter the cavity of the uterus through their own efforts and activity, and that the mucous plug above described affords very material aid and assistance to facilitate their entrance into the cervical canal, where indeed they may occasionally be found.

“That such a procedure is a common or even a frequent occurrence during conception, is, as I have already stated, highly improbable. On the contrary, C. Mayer<sup>2</sup> has well

<sup>1</sup> Berliner Klinische Wochenschrift, 1871, Nos. 26 to 28.

<sup>2</sup> Virchow's "Archiv," vol. x., p. 127.

stated the facts when he showed that, according to his experience, such a tough and almost impenetrable secretion as the mass spoken of above may constitute in itself a direct and perfect barrier to conception, by plugging up the cervical canal. The spermatozoa, or rather the intimate mixture of the semen and uterine mucus, is either carried to its proper field of action by some other force, or, missing its normal destination, it flows out of the vagina in its original intimately mixed condition. It is a popular theory, and one quite well known, that women who do not desire to become pregnant, and who, having been exposed by cohabitation, fear that they may become impregnated, endeavor in a variety of ways to remove this fluid from the genitals immediately after coition.

“In endeavoring to investigate into the means employed by nature to make the coitus fruitful, by transferring this mixture of semen and mucus from the organs immediately concerned in its elaboration into the cavity of the uterus, we shall call to mind the better known process which is exemplified by the erection of the male organ. The act of coition, in order to be perfectly satisfactory to both parties, is characterized by a contemporaneous erection of the organs immediately or rather principally concerned therein, and also by an ejaculation of a fluid material from both sides at the same instant. According to Johannes Mueller,<sup>1</sup> the penis retains its erect condition even after the ejaculation, and forces the semen into the orifice of the uterus by being itself repeatedly thrust into the depths of the cavity of the vagina, somewhat after the style of the piston of a syringe. This statement of Mueller’s has been repeatedly and successfully attacked, by reason of its non-agreement with the facts. While, indeed, in some animals, as for instance the dog, the penis seems to be charged with the office of plugging up the vagina for a certain period of time after the ejaculation, yet it is the rule with the majority of the other mammalia, and more particularly man, that a complete relaxation of the male organ quickly follows the act of ejaculation. If, now, the lower segment of the uterus in woman has also been in a high state of erection, we only need go back for our premises to the anatomy of the parts and a few simple ideas, to be able to follow up my train of argument leading us clearly

<sup>1</sup> Handbook of Physiology, vol. ii., p. 648.



to the necessary consequences. The cervix uteri clearly shows, even in the virginal condition, a division into two erectile portions, which, however, are not placed side by side as are the corpora cavernosa of the penis, but as is manifested in the os uteri, one above the other. There exist evidences even in the virginal condition of such a circular arrangement, and this arrangement is apparently more fully developed during the involutions occurring after several pregnancies. If the strongly erected cervix uteri now suddenly relapses into the condition of relaxation, there is manifested a larger opening at the external os than had existed in its erected state, or even in its normal condition.

“The second process which manifests itself immediately after the sudden relaxation, and one which is to be necessarily inferred from both the physical and physiological relations of the parts, is aspiration. This is the means by which the mucous mass, including the spermatozoa, as above referred to, is drawn through the cervical canal into the uterus, and this latter organ, in all probability, aids in this movement, inasmuch as its congested and swollen walls also relapse into their normal condition immediately after the relaxation mentioned. This aspiration, or sucking-up movement, by the os and cervix uteri, by which the semen, mixed with the fluid which is ejaculated from the cervical canal, is brought into intimate mechanical contact with the cavity of the fundus of the uterus, is no new idea. It has been frequently mentioned in works on physiology and gynecology, and it has also been observed in animals, for example in the rabbit, by means of vivisections. It is further well known to many women, who have been guided by former experiences, that certain sensations which peculiarly accompany the process of aspiration, taken in connection with the almost absolute absence of mucus from the vagina after cohabitation, constitute to them some of the surest signs of conception. This aspiration movement can also be frequently distinguished by the male during coitus, and in a word, the aspiration movement is a well-known fact; but it is only intelligible when viewed in connection with the rigid erection and the consecutive rapid relaxation of the lower segment of the uterus, as already described.

“A theory of aspiration which approaches the one under con-

sideration in a few of its essential points, has been carefully elaborated by Eichstedt,<sup>1</sup> in which he, however, conceives the action of the uterus, while under this influence, to be quite different from that advocated in this paper. According to his theory, the uterus, which in its normal unexcited condition is compressed or somewhat flattened in an antero-posterior direction, becomes during the period of excitement round, and more pear-shaped in its outline, by reason of the increased afflux of blood to the organ, during which, and by means of which change in its shape, a cavity is formed in its interior. This process commences at an early period in the coition, but it is only manifested in its highest degree of erection just after the ejaculation of the semen. This change in the shape of the body of the uterus, and this expansion of the cervical canal, remain for a considerable time after the completion of the coition, and thus the semen is aspirated by means of this comparatively permanent expansion. The points of variance between the views of Eichstedt and my own ideas on this subject are easily appreciated by all by means of the representations which have already been made by both of us. Inasmuch as the detailed description of observations in this region must of necessity be barren, owing to many reasons that cannot fail to be readily apparent to the observer, the principal of which is owing to the great difficulty with which such investigations are made. I refer for additional proof of the truth of my proposition to a simple experiment, designed to partially show the anatomical relations of the parts. If we take an ordinary colpeurynter, and remove from it the tube by which it is intended to be inflated, and traverse the long axis of this instrument with a rubber tube which shall enter the colpeurynter at its opening, pass through it lengthwise, and emerge from a perforation in the fundus of the bag, but attached to the mouth of the colpeurynter in such a manner as not to be easily separated from it, having the upper end of the tube hermetically sealed to the wall of the instrument, and having the lower end open, and not in any way communicating with the cavity of the bag; and now inflate the instrument itself to perfect transparency, we shall perceive how, during the process of inflation, the rubber tube is gradually extended as to its length, but at

<sup>1</sup> Zeugung, Geburtsmechanismus, etc. Griefswald, 1859.

the same time becomes thinner as to its walls, and materially narrowed as to its calibre. The expansion of an oblong cavity which traverses another expansible body in the direction of its long axis, is only conceivable when a spécial apparatus connects the walls of the first-named cavity with the outer walls of the erectile body. Further, we can render this experiment more conclusive by inserting another tube into the open end of the tube already described, connect them so that they shall be air-tight, and dip the open end of the last-mentioned tube into some liquid. You will now notice that even during the greatest expansion of the colpeurynter, not a single drop of the fluid is aspirated.

“Whenever a thrifty conception occurs, it would, at first sight, seem that the organs immediately concerned therein had fulfilled their proper and entire duties in the premises; for the cervix gradually closes itself, probably to shut out the remainder of the combined ejaculated mass which has not been utilized; and it would seem as if the erectility of the lower segment of the uterus might be dissipated. That it, nevertheless, is further excited and further employed, is reasonable, judging from the extensive requirements of married life. That this lower segment does respond to the sexual stimulus, even when in the pregnant condition, I have, I believe, fully demonstrated in my observations upon the first case related in this paper. It seems therefore, that some small concessions are made by nature to sexual enjoyment, even during pregnancy. It very often happens, however, that under these very circumstances an impetuous excitation of the erectile powers of the cervix, not having any higher purpose to serve, punishes itself by producing abortions.

“With regard to the anatomical relations of the vessels concerned in erection during pregnancy, Hyrtl<sup>1</sup> has defined and laid down certain premises. According to this author, the arteries of the cervix are only apparently dilated, and simulate this appearance by the thickness of their walls, which probably exceeds the thickness of the same walls when in a normal non-erectile condition. They are, therefore, in the first place, reduced in their calibre during pregnancy, and in addition to this, the arteriæ uterinæ proper, and a large proportion of

<sup>1</sup> Scanzoni on Chronic Metritis, page 8.

their smaller branches, now wind themselves spirally upward along the lateral portions of the uterus. The following observations were first made by Hyrtl, and he is confirmed therein by Briquet.<sup>1</sup> They are to the effect that these spiral twistings of the arteriæ uterinæ only take place during pregnancy; that they are wholly absent in virgins, and that this condition only remains after accouchement, in so far as that the 'wider and longer spirals' are reduced by the contraction of the uterus to shorter ones. In these facts we find, at the same time, an indication of the duties which attach to the erectile portions of the uterus during involution. In the re-formation of the short, wide spirals, and the restitution of the peculiar small arteries springing from them, as described by Henle, lies the possibility of being able to re-establish the erectile power for use in future conceptions. In the etiology of chronic metritis or chronic infarct, we find sufficient reasons supplied for the existence of these conditions in the frequent instances in which this object is not attained, or in which, at best, it is only incompletely fulfilled.

"Before concluding this essay with a glance at this pathological process, I beg to submit that I have arrived at a very defective section of this paper. The publication of this monograph was premature, owing to external untoward circumstances, and I therefore expressly ask that the point now to be considered be regarded in the light of a preliminary statement. I have, at every point in the preceding portion of this paper, placed the lower segment of the uterus in antagonism to the upper portion. I have done so not only because the erection is proven and palpable in the former, and because a similar process in the latter is only supposable, but also because I consider that these two segments receive their nervous supply from two different sources. Recent investigations make this latter statement very probable. If we consider the fact that the erection of one or both of the nipples, and that of the cervix uteri, are frequently observed to occur simultaneously, and further, when we consider the statements of careful and competent observers, such as Seanzoni, Grailly Hewitt, and others, on the connection of the process of contraction and involution of the uterus, in which, however, very probably the lower segment

<sup>1</sup> *Ibid.*, page 3.

only is concerned, with that of lactation, the theory of a common centre of innervation placed high up in the medulla spinalis, it seems to me can only exist in the imagination.

“I permit myself to add only a few words in relation to the pathological views, which would seem to be authorized by the adoption of my mode of explanation of the anatomy and physiology of the lower segment of the uterus. It may truthfully be stated that the uterus is an organ not only ‘disposed to congestions, labors under very unfavorable circulatory arrangements, is exposed to hyperemias, blood stases, etc.,’ but which also fulfils with its circulatory apparatus the necessary and important functions of an erectile body. The most important of the pathological conditions which come under consideration is the so-called chronic metritis, with its many names, and its still more numerous theories of causation. Andral has already ceased to look upon this affection as an inflammation. More recent observers, especially Hughes Bennett, have followed in his wake, and have ably supported their positions by both arguments and facts. Assuredly the circumstances that the veins of the uterus are destitute of valves, the force of the heart’s action weakened by reason of remoteness and the force of gravitation, certainly also the physiologically repeated congestions of menstruation, all play a conspicuous part in the origin of the blood stasis and induration found in this disease. Of just as much moment, however, is the consideration of the fact that while in the male unnatural and long-continued erections often constitute the causes of other diseases, so in the female, only probably more certainly and in a far higher degree than in the male, do the repeated and improperly-excited erections of the uterus also stimulate other diseases into action when latent, and also create new disorders.

“The unfavorable influence which insufficient involution after pregnancy exercises upon the re-establishment of the normal tone of the erectile portions of the uterus, has been pointed out in an earlier part of this paper.

“Upon the receipt of a copy of the paper just given, which I sent to Professor Bischoff, he replied in acknowledgment thereof, and further wrote me as follows: ‘I cannot, I think, better express my thanks for the receipt of your essay than to call your attention to several observations and statements con-

tained in my work "On the Development of the Mammalia and Man," which I notice your views upon the processes attending conception closely follow. I have procured a copy of this well-known, but not readily accessible work, even here, and find the following ideas mentioned just after some older items by Valisneri, Dionis, and Haller, on pages 23 and 24: Günther has further made it appear to be very probable that in the mare, and also in other animals, the uterus exercises a sucking action upon the semen, as well at the moment of ejaculation as thereafter. If we further add that, as a rule, very few or no spermatozoa are found in the vaginas of bitches and rabbits after cohabitation, while I have always found them present in large numbers in the uterus; it seems to follow, with great probability, reasoning from all these facts, that at the time of a fruitful coition, very probably at the moment of the highest excitation and ejaculation, the uterus moves downward in the cavity of the pelvis, the os uteri opens itself to a certain extent, the semen is received into the os, and in this manner reaches the uterine cavity, partly in a direct manner, and partly through the suction action of the os and cervix uteri.'

"I deeply regret the fact that I had not at my command the work of Professor Bischoff's alluded to, while engaged in writing my essay. The precise and lucid description of the processes of ejaculation and aspiration just quoted, would have materially assisted me in the production of more convincing proof, and a better connection of that which is already known, with the fact of the erectility of the lower segment of the uterus, and the additional fact of the erection of this lower segment as anatomically established by Henle, and physiologically explained by me.

"With reference to the necessity of these functions, we find the following sentence in the 'History of the Development,' etc., just quoted, page 24: 'As both processes, the ejaculation of the semen as well as those movements of the uterus, very probably occur at the instant of the highest excitement, we might probably find one of the most frequent causes of the inefficiency of many cohabitations, in the fact that these crises do not, by any means, always coincide as to the precise instant of their occurrence in both parties, by means of which non-coincidence the seminal fluid may be prevented from entering the uterus.'

“In his letter above referred to, Professor Bischoff makes the following remark as additional upon this point: ‘Nevertheless, I do not believe that we should overlook the fact that though in all probability these processes may and do favor conception, they should not by any means be regarded as absolutely necessary to the normal occurrence of this condition.’

“Although, as is self-evident, I place the greatest reliance upon Professor Bischoff’s views in this department, yet I hope to be able, in some future paper on this subject, to support and fully establish my conviction of the absolute necessity of the mechanism just under consideration.”

Gentlemen, we have reached the fourth division of this paper. I have already trespassed upon your time and patience to such an extent that the idea strikes me very forcibly that I will at this time add nothing more to the statements on this subject which have just been submitted to your mental inspection; but, following the example of the talented author of the last quoted paper, I hope to return to the charge at no very distant day, and hope then to be able to shed some additional light upon the as yet somewhat obscure points in this paper.

Although the processes to be investigated are exceedingly delicate in their nature, they will, in spite of this fact, surely at some time be made intelligible. There are many obscure points as yet to be found in these theories; but this fact should not be productive of surprise, when we remember that this inquiry is yet in its infancy.

Gentlemen, again I thank you for your interest and attention.

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## ON DEFORMITY OF THE UTERUS,

WITH SPECIAL REFERENCE TO ANTEFLEXION.

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IN the majority of standard works on the diseases of the uterus, prolapsus, ante- and retroversion, ante- and retroflexion, are all classed under the head of “displacements.” This, I am satisfied, is an imperfect arrangement, as it groups together

widely different pathological conditions. In anteversion and retroversion there is simply displacement or dislocation, the structure and form of the uterus remaining unchanged; while, on the other hand, flexion of any kind involves a lesion both of form and structure, and is consequently a *deformity*. To class the two affections together, appears as unscientific as it would be for the surgeon to place club-foot under the head of dislocations of the ankle joint.

Levret and Denman, who were the first to describe flexion, considered it as a peculiar form of version, or as a complication of version. Ashwell, Hodge, Hewitt, and many others, while recognizing a difference in the pathology of flexion and version, consider that as regards causation and treatment they are about the same. A step far in advance of this has been taken in modern times by Virchow, Scanzoni, Thomas, Peaslee, Wright, and others, who consider flexion as differing in every essential from version. Still, even these authorities class flexion under the head of displacements.

I prefer to consider flexion of the uterus as a *deformity*, because it certainly belongs to that order of pathological conditions. The pathology, cause, symptoms, physical signs, and treatment of flexion, all differ from version; hence the clearer the distinction between the two can be made, the less liability there is to confusion.

Flexion of the uterus is most frequently a congenital deformity, some arrest or derangement of development giving rise to the malformation. Occasionally, it results from some disease, inflammatory or degenerative, which weakens the uterus at a certain point and permits it to become bent upon itself. I intend to limit myself to the consideration of flexion occurring as the result of these two causes, and shall purposely omit all deformities caused by pre-existing affections, such as adhesions of the uterine body to other pelvic organs; tumors in the walls of the uterus, which, by their weight, bend the uterus over; pressure of abdominal tumors, which crowd the uterine body to either side. Whenever flexion is produced by some preceding disease, I prefer to consider it as a complication of the primary affection, rather than discuss it as a distinct condition.

The point of flexion is usually at the junction of the body and cervix. It may occur above or below, but only as a very unim-



portant exception to the rule. The several forms of flexion have been arranged in three degrees—first, second, and third.

There is another classification by Professor Thomas, in which the first is called flexion of the body, the second flexion of the cervix, and the third flexion of both body and cervix. This arrangement does not, in my opinion, agree with the facts. The flexion, as a rule, occurs neither in the body nor cervix, but at the junction of the two. It would be more in accordance with the actual facts to say that in all cases the body and cervix deviate from their normal position, and the extent to which they do so constitutes the three degrees of flexion.

Taking the ground that flexion is a *deformity*, we would naturally look to some defect of development for an explanation of the pathological anatomy of the malformation. And in order to understand the lesions of form and structure arising from arrest or derangement of development, it becomes necessary to review, briefly, the primary evolution of the uterus.

The primary elements of the reproductive organs, as seen in the female foetus, are two filaments, situated on either side of the inferior portion of the spinal column. These are known as Müller's filaments. In process of time these filaments are converted into canals or ducts. The lower end of these (originally parallel) ducts come together, and finally unite, up to a point which afterwards corresponds to the lower portion of the fundus uteri. From this united portion the uterus is formed, and the upper and diverging portion of the ducts form the fallopian tubes. At this stage of development the organ resembles the mature uterus of some of the lower animals. The united portion of Müller's duct is at first divided into two cavities by a septum, but this partition gradually disappears, its removal beginning below and progressing upward. At this time (about the fifth month) the upper portion of the uterus is separated into two horns. These horns are united at the seventh month by the fundus uteri being developed, which rises up in an arch from above the orifices of the fallopian tubes. During the sixth and seventh months the elementary portions of the uterus are complete, but the cervix is much larger than the body. It presents an appearance nearly the reverse of that which exists in the fully developed uterus; *i.e.*, it looks like a pyramid resting on its base, while in adult life

these relative proportions are reversed. Throughout the eighth and ninth months the size of the body and fundus increases; but up to birth, and for a time after, the size of the cervix is greater than the body. When the mucous membrane of the cavity becomes apparent, it is observed that the *palma plicata* extends nearly to the fundus, and laterally to the orifices of the oviducts. This arrangement continues until the period of the second dentition, when it disappears from the body of the uterus, excepting a longitudinal fold. This completes the intra-uterine or primary development of the uterus, which at birth is of an oblong rectangular shape.

Regarding the development of the vagina, and its relation to the formation of the uterus, there is still some difference of opinion. Müller, Rathke, and more recently Albers, have expressed the opinion that the uterus alone is developed from Müller's filaments, and that the vagina is formed by the inversion of the integuments. The investigations of Thiersch and Leukart, on the other hand, go to prove that the uterus and vagina, down to the hymen, are developed from the same filaments. This latter view is supported by Professor Dohrn, of Marburg. I have been inclined to believe that the uterus and muscular walls of the vagina were formed from Müller's filaments, but that the mucous membrane of the vagina was formed from inversion of the integuments. There are several reasons for entertaining this view, among which may be mentioned the fact that the mucous membrane of the vagina differs very much in structure and function from the lining membrane of the uterus, but bears so close a resemblance in every respect to the skin as to apparently indicate a common origin for both. This, however, is merely a deduction from certain points, and may not be true. I have not been able to demonstrate it.

This brief sketch embraces the development of the uterus and vagina up to the period of birth.

At birth the uterus and vagina are joined in such a manner that the cervix uteri projects into the vagina but a very short distance, and about equally on the anterior and posterior walls of the vagina. This condition of the uterus at birth completes what is known as *primary development*.

After birth the uterus remains without change until puberty,

except during the time of second dentition, when the *palma plicata* disappears from the body of the organ, all but one fold, which runs lengthwise. The body increases a little in size, so that the body and cervix become more nearly equal. At the same time the organ settles down into the pelvic cavity, and the cervix elongates and becomes more prominent in the vagina.

At puberty the uterus undergoes secondary development. The organ increases in size, but especially the body. Up to puberty the uterus differs but little from that of the new-born babe, which has been already described; but at the time when menstruation or functional activity of the reproductive organs is about to be established, it assumes the form and structure of the mature organ, which need not be fully described here. Suffice it to say, that as the tissues are developed, they become denser in quality, which gives to the organ the firmness necessary to support it and keep it from bending in any direction by its own weight.

There are two anatomical points bearing upon the subject now under consideration to which I desire to call particular attention. *First*, the position or relations of the uterus to other pelvic organs at birth, during girlhood, and after puberty; *Second*, the relations of the cervix uteri and the vagina at the completion of primary formation and after secondary development.

The infant pelvis is relatively narrower, deeper and less curved than the adult; hence the canal formed by the uterus and vagina is straighter than after puberty. The small size of the infant uterus, the thinness of its walls, and flaccid state of its tissues, render it capable of bending forward or backward according to circumstances. This fact may account for the variety of opinions regarding the position of the uterus previous to puberty. At birth the uterus is high up in the pelvis, but settles down during the second dentition, as has been already stated, and forms, with the vagina, the arc of a smaller circle, having its concavity forwards; hence the greater liability of the uterus to be anteflexed or anteverted during girlhood, if it deviates at all; but according to Klob the uterus is neither bent forward nor backward until puberty.

From the information obtained by the study of embryology and the anatomy of the reproductive organs, we must necessarily

consider the uterus and vagina as one canal. The peculiar arrangement at the junction of these organs appears as if formed from an invagination of the canal, the upper part of the vagina receiving the duplication of the canal which forms the vaginal portion of the cervix. This invagination is very slight at birth, as may be seen by referring to any normal infant uterus. The projective portion of the cervix at this period is about equal, anteriorly and posteriorly. During the period of second dentition, when the uterus settles down, this portion of the cervix becomes more apparent still. It will also be observed that the posterior wall of the cervix projects a little farther than the anterior. At puberty, when the sexual organs undergo secondary development, inversion progresses still further, and the cervix and vagina assume the relation of adult maturity. We then notice that the portion of the cervix which projects into the vagina is much longer posteriorly than anteriorly. This must necessarily be so, to some extent, from the fact that the uterus and vagina form an arc of a circle corresponding to the curve of the pelvis ; but the difference is slightly greater than is necessary to make the curve an exact part of this circle. Perhaps it would be more correct to say that the junction of the cervix and vagina forms an obtuse angle.

I am thus particular in describing this part, because I hope to show, hereafter, that arrest or derangement of the process of invagination has much to do in causing flexion.

#### PATHOLOGY.

Flexion of any form necessitates some defect in the structure of the uterus. This constitutes the essential difference between flexion and version. The rule is, that flexion occurs at the junction of the body and cervix, at the point corresponding to the internal os. When it occurs in the body or cervix, it is an exception which need not be noticed here. At the point of flexion, the tissues of the uterine walls are deficient. On the side to which the organ is bent, the wall is attenuated and compressed. On the other side, the loss of tissue is not so marked, the thickness being but slightly diminished by the stretching. The submucous fibrous stratum of tissue, which is said to give firmness and support to the organ, is absent or

deficient on the side to which the uterus is bent. In short, the changes occurring from the pressure at the point of flexion are anæmia, and then atrophy.

The effect of flexion on the uterine canal is to produce constriction or occlusion of the internal os. The external os is generally more open than in health, owing to traction being made on the posterior lip. The stricture thus formed gives rise to accumulations of the secretions of the uterine cavity, and to partial retention of the menstrual products. The circulation in the uterus, as will be readily understood, is seriously interfered with. The obstruction keeps up constant congestion, and this may eventually lead to œdema, endometritis, and sometimes pelvic peritonitis.

All these conditions cause derangement of function. The menstrual fluid, in place of escaping passively, is expelled perhaps by spasmodic contractions, attended with colicky pain. In other words, there is dysmenorrhœa. Sterility also exists in the majority of cases.

These pathological conditions increase in severity. The pressure at the point of flexion tends to increase the anæmia and atrophy of the part, and the intrinsic support of the uterus being thus diminished, the flexion increases. Hence the flexion of the first degree often progresses to the second and third degrees.

The anatomical appearances in flexion are best described in Niemeyer's "Text-Book of Practical Medicine." I give that part which applies to ante-flexion: "On autopsy, flexion of the uterus may be readily recognized, as part of the posterior wall of the body, instead of the fundus, forms the highest part of the uterus. Generally, we may restore the sunken fundus to its position, but it sinks back again to its former place when we let go of it. If we cut the uterus out of the body, and hold it erect by the vaginal portion, the fundus sinks down anteriorly; if it be held horizontally, it not unfrequently holds its weight if the flexed side be upward, but it bends together if we reverse it." To this I would add, that in most cases the cervix projects into the vagina much further on the posterior wall than on the anterior; indeed, in marked cases the anterior lip of the os uteri is very little below a line corresponding to the anterior vaginal wall.

## CAUSES.

There are several causes of flexion, which may account for the different opinions held by authors on this subject. The errors, I presume, come from investigators accepting the cause found in a limited number of instances as applying to all cases of flexion. Some of the more important causes assigned may be briefly noticed.

Rokitansky considered that the peculiar density and arrangement of the mucous membrane of the cervix and lower part of the corpus uteri, formed one of the chief supports of the organ, and gave it its slight anterior inclination; consequently, he looked upon the pathological state of this layer as the basis in the development of uterine flexions. He thought the uterus bent upon itself from circumscribed atrophy of one of its walls, arising from inflammation. He claimed that the glands of the mucous membrane becoming distended from imprisoned secretions, so pressed upon the other tissues as to cause atrophy at that part. When the distended glands ruptured and collapsed, the part rendered thus defective permitted the uterus to bend upon itself. Several eminent writers on this subject, Dr. Ludwig Joseph being the most recent, after careful observations, have been unable to discover this peculiar condition of the mucous membrane and its submucous layer to which Rokitansky alludes. If they are correct, further discussion of this supposed cause is useless. Should Rokitansky be right, the cause he favors would chiefly affect cases of *acquired* flexion; while the majority of cases occur before we have any history or reason to believe that inflammation preceded it.

Virchow attributes the primary cause of flexion to congenital shortness of the anterior uterine ligaments, which drag the body of the uterus forward, or flex it. The uterus being held in this position, pressure results, which leads to atrophy of the tissues, and thus all the conditions of flexion are present. Klob, who is one of the best authorities on uterine pathology, doubts the views expressed by Virchow, and states that with the normal firmness of the tissue the uterus is not likely to be deflected by the cause in question. He also gives, as reasons against the theory of Virchow, the facts, that false membranes or short ligaments, which would incline and fix the fundus for-

ward, would necessarily cause pressure on the fundus of the bladder. This would cause the bladder to distend more in its lowest portion, which would press the lower part of the cervix uteri backward, and in place of producing flexion would cause anteversion. Klob admits that the cause assigned by Virchow may produce or maintain flexion, but only where there is defect of tissue in the uterus itself, arising from some anterior cause.

Thomas, while discussing the views of various authors on this subject, denies the influence of the broad ligaments in promoting flexion; and I infer that he gives preference to the views of Rokitsky rather than those of Virchow. He says: "We accept the position, then, that the loss of *tone* in one of the uterine walls is the pathological state which constitutes the basis upon which certain exciting causes create flexion." I presume that he means want of *tissue* when he speaks of loss of *tone*; and if so, then we agree regarding the importance of that condition as a cause of flexion.

That loss of tissue in one of the walls of the uterus is the basis on which exciting causes act to produce flexion, is not so clear. Professor Thomas, in the page preceding the one just quoted from, clearly demonstrates that the uterus is prevented from bending upon itself by the inherent strength and resistance of the normal tissue of the organ; and if the part which sustains the body of the uterus be weakened, the organ will become flexed from its own weight. This I accept as being a perfectly true representation of the facts as they occur in pathology. It will be observed, however, that this view places deficiency of tissue as the chief and almost only condition which produces flexion. In place, then, of loss of *tone* (meaning want of tissue) being the pathological condition upon which exciting causes act, it is the chief cause acting directly to produce or permit flexion, the predisposing cause being the disposition of all oblong bodies to bend over if weakened in the centre.

The relation of the bladder to the uterus is looked on by some writers, including Virchow and Ludwig Joseph, as of some importance in the etiology of flexion. The uterus has been shown to make a descent corresponding to the variations in the shape of the bladder, which in fetal and infant life changes from the elongated fusiform to the short ovoid shape, and its fundus thus approaching the floor of the pelvis draws

the attached uterus with it. As the cervix uteri is closely attached to the posterior surface of the bladder, it will be readily understood that perverted development in the connections of the two organs might lead to flexion or version. All through life, the varying bulk and shape of the bladder exerts a slight influence on the position of the uterus, and requires to be considered in making examinations.

The only causes which I consider worthy of discussion in connection with flexion, when it occurs as a primary or uncomplicated disease, are,—*First*, Malformation resulting from arrested or imperfect development. Flexion arising from this cause may be classed among the congenital deformities. *Second*, Deformities arising from inflammation and degeneration of the uterine walls on one side. This will include atrophy of the anterior uterine wall at the os internum, from inflammation and distention of the cervical glands; also fatty degeneration in advanced life, and excessive involution after parturition, by which one of the uterine walls is weakened at the junction of the cervix and body. These may be called acquired flexions.

I purposely omit a number of conditions usually given as causes of flexion, such as metritis, enlargement of the corpus uteri, pregnancy, uterine tumors, abdominal tumors, accumulations of fluid in utero, ascites, fecal accumulations, tight clothing, muscular efforts, adhesions from inflammatory exudations. Several of these causes, such as pregnancy, produce flexion so very seldom that they may be treated as exceptions to the ordinary laws of pathology, and are of no practical importance. The others named are more important than the flexions which they produce, and I should prefer to discuss flexion occurring under such circumstances as a complication of the primary affection. It is, to say the least of it, objectionable classification, to discuss the primary and most important disease as the cause of a consecutive affection, and one which does not always follow.

Regarding the first cause—imperfect development—I can readily see how flexion might occur. During the time when invagination of the lower portion of the cervix and upper part of the vagina takes place, the process is liable to progress further on one side than on the other. Should the posterior vaginal wall become reflected much higher than the anterior, the



attachment of the vagina being lower on the anterior surface of the cervix would naturally pull it forward. From the fact that this malformation at the junction of the uterus and vagina is present in the vast majority of cases of antelexion, I have looked upon it as one important cause. If this arrangement should tend (as it likely does) to bring the cervix forward, so as to flex the uterus to a slight degree previous to its complete development, the pressure at the point of flexion would arrest the growth at that part, and then the wall would become more attenuated still, and the flexion increase.

Imperfect development may cause flexion in another way. The infantile uterus, having little strength of tissue to support itself, might readily become flexed, and so remain during the period of secondary development. I am aware that good authorities, such as Klob, state that previous to puberty the uterus is neither bent backward nor forward; but other observers have found the infantile uterus antelexed in many cases, and there can be no doubt of the truth of the statement; and we can readily understand why the organ might remain so. The uterus might readily increase in size at all parts except the portion compressed at the point of flexion.

Flexion occurs also from excessive development of the cervix. The unnaturally long cervix pressing upon the posterior wall of the vagina is inclined forward, while the body of the uterus remains in its normal axis. This produces slight flexion, which in time becomes greater, on the principle that the deformity, once established, tends to increase.

When flexion is caused by inflammation the explanation given by Rokitansky, and already referred to, appears to be correct. Irregular involution is doubtless one of the causes of flexion when it occurs after confinement or miscarriage. If pressure was brought to bear on the cervix, fundus, or both, so as to favor the production of flexion, then involution might go on beyond the normal limits at the point of pressure. I am satisfied, from observation, that when retroversion occurs before involution is complete, it is liable to end in flexion if left untreated. The same may be true in anteversion. Under these circumstances the atrophy which permits the flexion occurs at the junction of the cervix and body, and is caused by pressure. We might infer, however, that atrophy could occur from ex-

cessive involution at that point of the uterus, but no good proof of this can be given.

Flexion occurs as the result of atrophy at the time of final involution, or when change of life takes place. I have several times found well-marked flexion after the menopause, when no such deformity existed before. The cause of atrophy in these cases is degeneration of the tissues. From the fact that acquired flexion is a very rare affection compared with congenital flexion, the causes which produce the former are of minor importance, and need not occupy much of our time.

#### NATURAL HISTORY OF FLEXION.

Derangement of uterine function constitutes the principal point in the natural history of flexion. Menstruation from its first establishment is often painful—there is dysmenorrhœa. The severity of the pain bears some relation to the extent of flexion. The greater the deformity, the more marked the pain is, though there are marked exceptions to this rule. The character of the pain is of the greatest importance. *It is intermittent, and always precedes the flow. When the flow begins, the pain either subsides or becomes much less.* The pain closely resembles that which occurs in abortion in the early months of pregnancy. The reason, I presume, is, that while the fluid is accumulating in the uterine cavity pain is excited by distention, but when the flow is once started it continues with less expulsive effort. True, painful menstruation often occurs without flexion, but in such cases the pain continues throughout the whole period, or the early part of it, and is not relieved by dilatation; while in flexion it precedes the flow and is relieved temporarily by dilatation. This pain at the commencement of menstruation is the most prominent symptom in the history of flexion as it occurs in the young girl. The trouble tends to increase gradually. If the patient gets married, all the symptoms usually increase. Should she become pregnant, there is great liability to miscarriage during the early months. The effect of the pregnancy, however, in part at least, is to remove the deformity, even when miscarriage occurs, so that pregnancy is likely to occur again, and go on to full time, when the deformity is cured completely. Checking the menses by exposure to cold, or any cause which will produce hyperæmia of the uterus,

or endometritis, promptly increases the dysmenorrhœa, and gives rise to new symptoms. Leucorrhœa, backache, local tenderness, deranged digestion, and nervous disturbances, are all added to the original symptoms. Sometimes in ante flexion frequent micturition is a marked symptom.

There are all varieties or degrees of prominence of the points in the natural history of flexion. The dysmenorrhœa which begins at puberty may continue, and increase but little through life. This is most likely to be the case if the individual remains unmarried, and can avoid all the conditions which tend to aggravate uterine disease. On the other hand, the dysmenorrhœa may increase in severity during each succeeding menstruation, and after marriage become intolerable. In the interval, previously free from trouble, symptoms of uterine and vaginal inflammation are manifested. Constitutional derangement, especially of the nervous system, follows, and in time we have the broken-down miserable patients, familiar to all practitioners. Such patients often seek relief in the use of stimulants and opium, which only soothe for a time, but eventually aid in undermining the health and strength of the unfortunate sufferer.

#### PHYSICAL SIGNS.

Although the history alone might guide us with a tolerable degree of certainty to suspect the presence of flexion, we must depend on the physical signs for an accurate diagnosis. The physical signs of flexion arise from the changed relations of the body and cervix to each other. These signs are detected by the touch and the uterine probe. The touch may indicate that the cervix occupies its normal position, or it may be found in a retroverted position, which is its most frequent position in ante flexion. The os points towards the introitus or axis of the vagina in the same way that we find it in retroversion. The vaginal portion of the anterior wall of the cervix is much shorter than the posterior. Carrying the finger along the anterior vaginal wall, the body of the uterus can usually be felt bending forward. The bimanual examination reveals the deformed condition of the uterus, in lean patients, whose abdominal parietes are yielding; but in fleshy subjects, with rigid abdominal muscles, very little can be learned by this mode of

exploration. When rigidity of the parts is the obstacle to exploration, an anæsthetic may be used with great advantage, as practised by Sir J. Y. Simpson.

When the signs thus obtained point to flexion, the diagnosis should be confirmed by using the sound. Much trouble is often experienced in introducing the probe. Indeed, it is impossible in extreme flexion to carry the sound into the uterus without first straightening the bend at the junction of the body and cervix. To do this, the cervix should be seized by a tenaculum, and gently drawn downward, while at the same time the fundus is pressed upward and backward. In this way the canal is partially straightened, and the sound can be introduced. There are cases where it is only necessary to curve the sound properly, and manipulate with care, and the point of flexion can readily be passed. When the sound passes into the body of the uterus in the direction indicated by the touch, the diagnosis is complete. While there are many conditions which might present the signs of flexion as obtained by the touch, the combined testimony of the touch and sound are sufficient to make sure of the diagnosis.

#### TREATMENT.

From the literature on the treatment of flexion, we learn that quite a variety of methods have been adopted. Leaving out of account all the means employed to relieve the extrinsic causes of flexion and to remove all complications, we find that the direct treatment of flexion as practised by various authorities may be classed under three heads:

1. Aiming to overcome the deformity by the use of extra-uterine pessaries, resting on the floor of the pelvis or on mechanical supports outside of the body.
2. Aiming to accomplish the same by the use of intrauterine pessaries, supported as above.
3. Failing to overcome the deformity, endeavoring to relieve the evil effects of flexion by dividing the cervix and dilating the canal of the uterus.

Rarely has any of these methods alone proved successful, hence we find that they have been variously combined, according to the judgment of different gynecologists. Meigs and Mackintosh depended on dilatation of the cervical canal by

bougies to overcome the chief troubles arising from flexion. Hewitt advocates the use of a vaginal pessary, which appears to be a modification of Hodge's double lever. The anterior curve has a prominent convexity, which pushes up the anterior vaginal wall, and with it the fundus and body of the uterus. It also, in most cases of ante flexion, pulls up the cervix by pressing up the short anterior vaginal wall, and thus increases the deformity in place of removing it. From Dillenberger, of Vienna, we learn that dilatation by elastic bougies and the instrument of Patsch are the principal means employed in treating flexion in his locality. The pelvic belt, by which, I presume, is meant the abdominal support, is also used by the same authorities. Hodge claims that he is almost always successful by using the uterine sound to restore the normal relation of the body and fundus uteri, and then using his ring pessary.

Prominent among those who advocate the use of the intra-uterine pessary, we may name Velpeau, Amussat, Simpson, Valleix, Wright, and Chalmers, in Europe, and Peaslee and Cutler in this country. Cutler, of Boston, is the only one, so far as I know, who has successfully used the intrauterine pessary, having a support outside of the body.

A brief review of the various plans of treatment will, I believe, show that while they are of great value, and capable of effecting a cure in many cases, still it will be found that they do not fully equal all demands. The use of extrauterine pessaries will relieve some of the prominent symptoms, but will not overcome the deformity. Intrauterine pessaries, while they sustain the uterus in its normal shape, are objectionable in some respects: they are often difficult to introduce, are not easily held in position, and are liable in some cases to cause so much irritation as to make their prolonged use dangerous to life.

The surgical methods which have for their object only to relieve the symptoms or evil consequences of flexion, are chiefly dilatation and division of one wall of the cervix. Dilatation is certainly of much value, but the improvement is often, indeed generally, only temporary. Division of one of the cervical walls answers the same purpose as dilatation, and the effect is not more lasting. But neither of these modes of treatment overcomes the deformity altogether, and they seldom perma-

nently cure the troublesome symptoms. The merits of the operation of dividing the cervical wall appear to me to be, that by incising the circular fibres of the os the longitudinal ones contract, and thus shorten the posterior wall of the cervix. This shortening brings the two walls more nearly equal in size, and in part establishes the proper relations of the body and cervix. The canal is also shortened, though this may have but little effect on the symptoms.

Dividing the apex of the angle at the internal os, as practised by Dr. Emmet, and causing it to heal by granulation, by the frequent use of the sound, strengthens the anterior wall of the uterus, and enlarges for the time being the size of the canal. I cannot suppose that the sole object is to enlarge the canal at the internal os, at the expense of an abnormally thin wall.

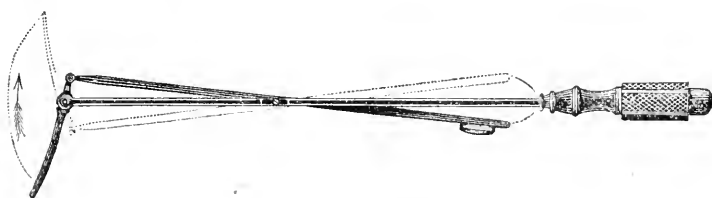
To call in question anything relating to this operation, which has for its author so distinguished a surgeon as J. Marion Sims, may appear like an unpardonable boldness. Nevertheless, I am convinced that it is not all that is required in the treatment of flexion. I have seen several cases where the operation had been well performed, and where pregnancy did not follow, but where the dysmenorrhœa returned, and all the other symptoms which accompany flexion.

Without hoping to give a perfectly reliable and all-sufficient mode of treating anteflexion, I simply propose to record the method of treatment employed in my own practice. I believe I am warranted in saying that the results obtained are fully equal to those following other plans of treatment, while avoiding most of their danger. The indications for treatment are:

1. To restore the normal relations of the body and cervix uteri; and as far as possible to adjust the connections of the uterus and vagina, if any abnormality exist there.
2. To hold the uterus in proper shape after the first indication has been fulfilled.
3. To excite development of the uterine wall at the point of flexion.

To fulfil the first indication, two methods are to be relied upon. The fundus uteri can be raised and the flexion straightened by the Uterine Adjuster, the only instrument which is reliable in accomplishing this object. The accompanying figure illustrates an adjuster which I devised over two years

ago, and have found quite valuable. The instrument is made to fulfil the function of a finger as nearly as possible. The finger portion is composed of three phalanges, jointed, so that they can be flexed until they close, and extended until they form a straight line, thus giving the two chief motions of the human finger. The stem is divided longitudinally into two halves, one of which is attached to the handle, and terminates in half a sphere at its distal end. This half sphere articulates with a corresponding half sphere at the commencement of the first phalanx. The joint forms a round ball, as may be seen in the figure. The other half of the stem is attached to a short lever which projects from the finger where it joins the stem, and the two halves of the stem articulate in the middle by a pivot or screw, which is fixed in one half of the stem but works in a fenestrum or slot in the half which articulates with the finger. The half of the stem which articulates with the lever projection from the finger terminates near the handle in a ring, which admits the finger of the operator's hand. For the purpose of extending the phalanges, when they have been flexed, a piece of cord is attached to the last phalanx, and runs over the other joints of the finger, the spheroidal joint, and along the stem to the handle. The finger is screwed into the round ball at the end of the stem, and can be readily detached. By this arrangement several sizes of fingers can be used.



The mode of using the instrument is this. Grasping the handle, the point of the index finger is inserted into the ring of the right-hand half of the stem. By pressing this ring upwards and downwards, the pivot moves backward and forward in the slot, and the finger is made to sweep the arc of a circle as large as the operator may desire. By pulling on the cord the finger can be held perfectly straight, or when in a flexed position extension can be made. The instrument is very simple in con-

struction, and can be easily manipulated. Reference to the illustration will give a better idea of it than the most minute description.

It may be observed, in passing, that this instrument will be found valuable in the restoration of all forms of uterine displacement where an adjuster is required. It answers very well for straightening the flexed uterus. The finger-like extremity can often be carried past the point of flexion when the straight sound would fail. The joints permit the finger to bend so as to accommodate itself to the canal. In this it resembles Squire's vertebrated catheter. When the adjuster is carried into the cavity of the uterus, traction should be made on the cord, which will straighten the finger and the uterus with it. Where the cavity of the uterus is large, the finger can be rotated after it is introduced. This movement will extend the phalanges till they form a straight line, and the uterus must necessarily be straightened at the same time.

The other mode of straightening the flexed uterus is to seize the cervix with tenaculum or forceps, and then raise the fundus by pressing upward on the vaginal wall with an elevator or spring holder. Holding the uterus in this position, a small sound, well curved at the point, is made to pass up to the fundus. Some difficulty may be encountered in doing this. The curve of the sound may require to be changed again and again, and the most careful manipulation persisted in. When the stricture at the point of flexion is passed, a small sea-tangle tent should be curved to correspond to the bend of the sound, and then introduced into the uterus, and allowed to remain for twenty-four or forty-eight hours, or until it comes away spontaneously. Though curved when introduced, the tent straightens as it swells, and thus the flexion is overcome for the time being.

Several authors state that no benefit is derived from straightening a flexed uterus, because it immediately falls back to its original deformed condition. That the deformity returns, cannot be denied; but I believe that each time the flexion is overcome something is gained in the treatment. When the sound has been once introduced, it can be more easily used again. The compressed tissue at the point of flexion being put upon the stretch when the fundus and cervix are brought into line,



is probably stimulated to increased growth. Be this as it may, the fact has been noted by several reliable observers, that by repeatedly adjusting a flexed uterus some slight improvement is observed. The flexion retards the circulation in the uterus, and thereby causes distressing symptoms; and when the uterus is restored to its normal shape the obstruction to the circulation is removed for the time, and some temporary relief is derived. But granting that no benefit arises from adjusting the uterus, still it is the initial step in the treatment, and must precede the fulfilment of the other indications.

The remaining portion of the first indication is to adjust any abnormality in the connection of the uterus and vagina. When the vaginal portion of the cervix is unusually long and conical, amputation may be called for, and is often followed by very satisfactory results. In the majority of cases a less important operation will answer. By clipping out a V-shaped piece in each lateral edge of the os, and extending upward from an eighth to a fourth of an inch, a few of the circular fibres are divided. This causes the longitudinal fibres to contract, and thus shortens the vaginal portion of the cervix.

By far the most important lesion that occurs in the connection of the uterus and vagina is the imperfect invagination of the anterior wall of the cervix, which has been described under the pathology section. To overcome this deformity, I have adopted the following plan of treatment: The patient is placed on her left side, and Sims' speculum introduced. The posterior lip of the os uteri is seized with a tenaculum, and the cervix drawn backward towards the hollow of the sacrum. This puts the anterior column of the vagina on the stretch, at the point where it is reflected on the cervix. The vaginal wall is then divided transversely with the scissors, about three-fourths of an inch from the os uteri, the incision being from a quarter to three-eighths of an inch deep. The vaginal wall at the upper edge of the wound is dissected up, so that when the incised portion is put upon the stretch the sides will come together. In other words, the upper and lower edges of the incised central portion of the vaginal wall are drawn apart, and the sides brought together to fill the space; so that the transverse incision now appears as a longitudinal one. Three or four wire sutures are introduced, to keep the parts together till they unite.

If the uterus is slightly below its normal level, and inclined to retroversion (a condition very common in ante flexion), much benefit will be obtained by introducing a double lever pessary, larger at its posterior extremity. This will hold up the uterus, and by making pressure in the posterior vaginal cul-de-sac draw the cervix backwards, and thus hold the edges of the wound together and favor union.

The effect of this simple and safe operation is to bring the anterior wall of the cervix further down into the vagina, and permitting it to extend backwards more towards the axis of the pelvis, where it ought to be. This plan of treatment I have found to be sufficient for the relief of the deformity at the junction of the vagina and cervix uteri.

Before devising this operation, I accomplished the same object in the following manner: In place of incising the vaginal wall, a curved needle, armed with a double silk thread, was made to transfix the vaginal wall close to, and as high up as the middle of the cervix. The ends of the thread were brought round a piece of hard rubber and tied tightly. This piece of rubber was formed to act as a kind of splint to keep the uterus straight, while it held the thread and kept constant traction on it till it cut its way out. The splint was two inches long, bent at an obtuse angle; the lower and shorter side of the angle being made concave, so as to fit round the cervix. At the apex of the angle, or a little above it, two holes were drilled near the edges; and on the other side, and between the holes, a groove was cut, to receive the thread when it had cut its way nearly through the vaginal wall. A piece of steel spring ran from one side of the angle to the other, round which the thread was tied; and this kept up constant traction on the thread until it cut its way through the vaginal wall. This plan of treatment I have abandoned, because I think the other method preferable.

It has already been said that the canal should be dilated, by means of a sea-tangle tent, at the beginning of the treatment; but this can be done only when there are no contraindications. When there are any inflammatory symptoms, or extreme irritability present, dilatation is a most dangerous proceeding. Flexion is often attended with endometritis or subacute pelvic peritonitis, and these must be relieved before instituting any active treatment for the flexion. I am satisfied

that the employment of treatment for flexion, while the uterus was in a congested and irritable condition, has been productive of much serious evil. Before using tents, or making any great efforts at straightening the uterus, I repeat that all co-existing diseases should be removed. When this has been accomplished, I employ a sea-tangle tent, as already described. This is usually sufficient to relieve the dysmenorrhœa for a time, and it tries the toleration of the uterus to the presence of anything in its cavity. If the tent causes no marked symptoms, I then use another, and find, as a rule, that they give rise to no serious inconvenience. The sea-tangle is the least irritating of all the intrauterine stems which I have tried. The only objection to this tent is the trouble to keep it in place, to get over which I have adopted the plan of tying it in. I take a needle armed with a silver wire, or silk thread, and pass it through the left lateral lip of the os uteri; then withdrawing the needle from the vagina, I carry it through the hole in the end of the tent, and then through the right lip of the os. The tent is then introduced, and the two ends of the wire brought together and twisted. This holds the tent in place, and the tent keeps the uterus straight. The presence of the suture in the cervix gives rise to no more trouble than ear-rings, and the tent can be worn in this way for a week or two, when it may be removed. This I have found the most satisfactory intrauterine stem to use before resorting to the stem pessary.

This amount of treatment is sufficient in some cases to relieve the dysmenorrhœa and general symptoms, and nothing further is required. In the majority, however, the dysmenorrhœa and other symptoms return in a lesser degree, and then intrauterine pessaries are called for. There is a great variety of these instruments, but those most deserving of notice which I have seen are Wright's (modified by Chambers) and Peaslee's. In order to fulfil the requirements, the instrument must be light, strong, and self-retaining. The first of these qualities is obtained by the material employed. Wright's, as used by Chambers, is made of hard rubber, and so far answers well; but the shape of it is very objectionable. It is simply a stem divided into two halves, so as to form a V shape. It is sufficiently elastic to admit of folding the two halves together, while it is being introduced, and spread out when in place. To adapt the

shape of the instrument to the form of the uterine cavity, I have the pessary made a single straight rod for about an inch at the lower end. This fits the straight canal of the cervix. The upper end is bifurcated to suit the triangular cavity of the body. Peaslee's pessary—that is, the last one devised by him—is, I think, the best. It consists of a straight stem, with two flexible wings standing out from the upper half of it. This form corresponds to the shape of the uterine cavity, and has the advantage of giving support in the median line of the uterus.

Wright's pessary is introduced by a holder like a uterine sound, only hollow at the end, which is slipped over the stem like a canula over a trocar. In this way it is introduced, the pessary held in place, and the handle withdrawn. The handle used by Chambers—at least one of his which I imported from London—is almost straight, and in order to use it the uterus has to be drawn downwards and backwards until its axis coincides with the axis of the pelvic outlet. To accomplish this, most unwarrantable violence must be done to the parts. Indeed, in my hands the holder was useless. To overcome this difficulty, I had a canula made about two and a half inches long, which could be attached to the adjuster in place of a “finger.” This is carried over the stem, and can be introduced as easily as the curved uterine sound or the finger of the adjuster.

What was said regarding treatment preparatory to the use of tents may be repeated in reference to the intrauterine pessary, viz., that all inflammatory symptoms should first be removed. It must also be remembered that patients wearing the stem pessary should be promptly attended to on the slightest appearance of uterine irritation. Rest should be enjoined, and if that fails to give relief, the pessary should be at once removed. Neglect of this on the part of patient or physician may be followed by fatal results.

The final question in this connection is: Will the deformity be permanently relieved if the uterus is held in its normal shape for a time? So far as my own observation goes, I am inclined to think that it will, but there are exceptional cases. The process of recovery is based, in part, upon the peculiar nature of the organ involved. The uterus, vagina, and surrounding tissues are so constituted as to be able to adjust their form to changing circumstances. Circumscribed atrophy or hyper-

trophy takes place more promptly in these organs than anywhere else in the organization. Place the uterus in any unnatural position, and very soon the surrounding tissues will become so altered as to hold it there. This law applies to normal as well as to abnormal conditions; and we may fairly predict that if a deformed uterus is restored to its normal shape, and held there, tissue changes will occur sufficient to maintain it in its proper position.

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## TREATMENT OF CHRONIC CYSTITIS IN THE FEMALE.

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As every experienced practitioner can testify, chronic cystitis is not only one of the most distressing of maladies, but also one of the most difficult to cure. From the nature of the functions of the bladder it is impossible, by ordinary means, to carry out the rational indications in the treatment of inflammation when the organ is diseased, that is, to remove causes of irritation and place the parts at rest. The excretory action of the kidneys being without intermission, urine is continually collecting within its cavity, and as soon as its walls are somewhat distended peristaltic movement is excited; moreover, the mucus acts as a ferment to the urea and converts it into carbonate of ammonia, which is highly irritating to the inflamed surface, and the coats of the viscus becoming thickened and indurated complete contraction is prevented, so that in spite of the agonizing efforts of the patient to get rid of the offending matter there is always a residuum of acrid fluid. The relief of these cases is utterly hopeless without drainage; this principle has long been recognized, the only problem being as to the best method of effecting it. It might be accomplished by the use of an ordinary or a Sims' catheter, but at the expense of protracted confinement to bed,\* which would be disastrous to the general health, and by weakening the powers of nature might protract or prevent recovery. To obviate this difficulty, some of our most eminent

surgeons have advocated and practised the establishment of an artificial *vesico-vaginal fistula*, through which the water could dribble away as fast as secreted. This measure generally cures the cystitis, although it entails upon the patient a grave and distressing lesion which ultimately requires the performance of a painful surgical operation for its removal.

For the last five years I have been enabled to manage these cases with the greatest satisfaction, and to effect perfect drainage without inconvenience or danger to the patient or confinement to bed, by means of a self-retaining catheter of my own invention. This instrument was figured and described in the *Richmond and Louisville Medical Journal* for Feb. 1869, in connection with the after-treatment in the operation for *vesico-vaginal fistula*. The following is the description there given, the measurements being slightly altered: "It is about two inches in length and bent to correspond to the curvature of the urethra; at the lower or external end there is a button ten-sixteenths of an inch in diameter, and at the other or internal end a shouldered, cup-shaped expansion, varying from five-sixteenths to seven-sixteenths of an inch in diameter, and beveled on the convex aspect of the instrument, in order to make it easier of



introduction, and perforated with a number of small holes. The stem intervening between these two portions is one and one-half inches in length and a quarter of an inch in diameter with as large a bore as is compatible with the requisite strength.<sup>1</sup>

<sup>1</sup> It is one thing for a physician to devise and another to get instrument-makers to carry his ideas into effect. I have experienced the greatest difficulty in obtaining these instruments properly constructed; a deviation from the proper shape or size, which might seem insignificant to the mechanic, may render them painful, non-retentive or difficult of introduction. Messrs. Otto & Reynders, of New York, have promised to make them accurately after my models, and furnish them to the profession in sets of three, at the reasonable price of \$3.00 a set. I would advise physicians to procure them only from these manufacturers.

This catheter is self-retaining in all positions of the patient, first by reason of the bulb at its upper extremity which passes beyond the urethra into the bladder; secondly, on account of its curved shape; and, thirdly, in consequence of the button being overlapped and grasped, as it were, by the vulva." At the lower end there is a slight projection or knob over which an india-rubber tube may be slipped; this being inserted into a bottle at night or into a urinal when the patient is up, her person may thus be kept perfectly dry.

The accompanying case is only one out of a number that I have treated on the same plan. I have selected it because it was the worst I have encountered, and serves to illustrate some of the difficulties we have to contend with, as well as demonstrates what may be accomplished.

CASE .—Mary —, an Irishwoman, of scrofulous habit, 26 years of age and unmarried, came under my care in June, 1871. She had suffered from chronic cystitis, originating as she believed from cold, for about four years; for the last two years she had been a helpless invalid, incapacitated for any kind of work. During this time she had been treated by several physicians without material benefit. She was much emaciated, with an anxious, worn expression, and suffered incessantly from vesical tenesmus, which compelled her to pass the greater part of the time straining upon the vessel. The urine was always ammoniacal, loaded with mucus, and occasionally bloody. The bladder was so exquisitely tender that she was unable to contract the abdominal muscles sufficiently to stand erect, so that her only modes of locomotion were upon all-fours, or in a stooping posture with her hands resting upon her knees. Dr. D. S. Reynolds, of this city, who had recently been in attendance upon her, very kindly gave me a detailed account of the treatment he had pursued, from which it was evident that nothing was to be hoped for from medication or injections, for, as he truly remarked, he had tried everything that had ever been found useful in such cases, except drainage; his idea being to accomplish this by puncturing the bladder.

Upon exploring the urethra I found it implicated in the disease, and so contracted and sensitive that it was impossible for me to introduce the smallest of my self-retaining catheters; but being unwilling to abandon the hope of effecting drainage in

this way, I substituted an exceedingly small catheter of the ordinary shape, and secured it *in situ* by means of cords; it produced such violent spasmodic pains, however, that I was compelled to remove it at the end of half an hour, and for the remainder of the day the urine, which had previously been simply turbid, was highly colored with blood. On the following morning I used the catheter again for half an hour, and instructed the nurse to repeat the operation at noon and at night. This course was persisted in for four days, the instrument remaining a little longer each time, until on the fifth day so much tolerance had been acquired that I administered an opiate, and directed that it should not be interfered with, except when she desired to have an action of the bowels. On the eighth day I substituted a Sims' catheter, a little larger than the first, and at the expiration of three weeks this was, in turn, replaced by the smallest of my own instruments.

In this time, there had been no essential change in the patient's condition; she did not suffer so much from straining, and could sleep better, but complained bitterly of the constrained position to which she was restricted, as it was necessary for her to lie upon her back that the urine could be received upon cloths and sponges placed between her thighs. Several attempts were made to fix a tube to the instrument, but there was so much leverage to the Sims' catheter that it gave her pain, and the straight one was invariably pulled out. When my catheter was introduced, I wanted her to get up and go about a little, but she was still unable to stand erect on account of the soreness in the hypogastrium. An india-rubber tube, four inches long, was attached, by which the urine was conducted into a bottle, and she could turn upon her side; in this way her comfort was greatly promoted. In two months her appetite had returned, she slept well, had little or no spasmodic pain, and all febrile excitement had subsided. I now introduced a catheter with a larger bulb, as the other had occasionally slipped out when her bowels were moved, and insisted upon her taking some exercise. With a view to keeping her dry when up, she was provided with an ordinary rubber urinal, which was strapped to the leg.

From this time improvement steadily progressed. She soon learned to remove and re-introduce the catheter herself, so as to



be of no trouble to any one. Very little medicine was given; occasionally she was compelled to take an opiate, and at intervals I prescribed a tonic. At the end of four months she could stand erect and was able to be upon her feet the greater part of the day. In six months she could do light household work, was free from pain, and the urine had returned very nearly to its normal state. She wore the catheter altogether about twenty months, for the last four or five of which, however, I regarded it as unnecessary; but she clung to it as to her best friend, and when she did give it up, it seemed to be with reluctance as well as with apprehension. Nearly a year and a half has now elapsed since all treatment was suspended, during which she has been engaged in ordinary domestic duties, such as cooking, washing and house-cleaning, and I have every reason to believe is permanently cured.

It occurred to me in connection with this case, that the maintenance of the bladder for so long a time in a collapsed condition might lead to a permanent diminution in its capacity, and I was several times tempted to resort to occasional injections of tepid water with a view to preventing it. But it would have been needless trouble, as she assures me that she has been able to retain her water for as long a time since her recovery as she could before, generally passing it five or six times in twenty-four hours.

I do not always find difficulty in establishing a tolerance of the catheter; in some instances where urethra has not been involved, I have introduced one of the largest size at the outset, without confining the patient to bed for a single day. In one case the relief from tenesmus was instantaneous and complete.

It will sometimes be found that although the instrument is well borne when the patient is recumbent, it will produce pain when she is erect. This is due to too great a curvature in the stem, causing the point to press against the anterior wall of the bladder. It may be easily straightened when the material is hardened rubber, by dipping it for a moment in boiling water.

It is never absolutely necessary to remove the catheter for the purpose of cleaning it oftener than once in three or four days, although I am in the habit, when the treatment has been thoroughly inaugurated, of furnishing the patient with two instruments, to be worn alternately one or two days at a time, the

one not in use being submerged in acidulated water to remove incrustations.

My experience in this method of treating chronic cystitis in the female leads me to the conclusion, that *any* case, uncomplicated by disease of the neighboring viscera, or serious constitutional dyscrasia, may be cured by drainage, unaided by local or general treatment. And in this I am sustained by the experience of others. In the April number of the *Virginia Medical Monthly* there is a very interesting case reported by Dr. Hunter McGuire, in which drainage was achieved by means of an india-rubber tube; four or five inches of the tube were pushed through the urethra into the bladder, and notwithstanding this large amount of foreign matter within the cavity of the organ, the cure was rapid and complete.

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#### THE TONIC AND ANTI-SPASMODIC RELATION OF ELECTRICITY TO THE DISEASES OF CHILDHOOD.

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By A. D. ROCKWELL, A.M., M.D.,

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THE primary and plainly obvious effects of a judicious application of electricity is decidedly stimulating. For many years, therefore, electricity, in its therapeutical relations, was regarded as little more than a diffusible stimulant, the effects of which passed away almost as completely and rapidly as the effects of alcoholic stimulation. On this basis it had for more than a century been used by scientific men in the treatment of disease, before its permanent tonic effects, or its influence over nutrition were even suggested.

It is, therefore, not surprising that its boundaries of usefulness should have been so restricted, and its proper place in therapeutics so little apprehended.

#### EFFECTS OF ELECTRICITY ON ORGANIC SUBSTANCES.

The resultant of the passage of the electric current through any organic compound is exceedingly complex. Mechanical and chemical effects are invariable, while if living tissue be the

object submitted to electric action, physiological effects occur. All these results, mechanical, chemical, and physiological, enter as factors in making up the therapeutical effects of both the galvanic and faradic currents, but their relative importance varies according to the kind of electricity with which they are associated.

#### MECHANICAL EFFECTS.

By virtue of its rapid interruptions, of its to-and-fro motion, the faradic current is pre-eminently mechanical in its action. Whether this mechanical action be due to molecular disturbance, to a modification of endosmotic or exosmotic action, to a bodily transference of substances, or to these causes combined, the practical observation that the application of the faradic current can be so controlled as to give the most active or the gentlest passive exercise, to both deep and superficial tissues and the organs of the body, remains true.

#### CHEMICAL EFFECTS.

Chemical or electrolytic action is more especially the province of the galvanic current, although the primary coil of a faradic apparatus is capable of producing slight chemical decomposition, and even the secondary and tertiary currents are not altogether destitute of electrolytic power. In surgery, the chemical action of the current is the important thing, but just to what extent it is in medicine an aid to mechanical and physiological effects, is uncertain. It is probable that every passage of a galvanic current, no matter how weak or widely diffused, is attended with some electrolytic effect, and therefore it must, to some extent, exert an influence in the general result of the electrical treatment.

#### PHYSIOLOGICAL EFFECTS.

The physiological effects of electricity are common to both currents, but the galvanic is of course most marked in its action.

It is a question of degree, rather than of kind, between the two. As before remarked, physiological effects are peculiar to living organic bodies, and is doubtless a modification of the vital processes by electricity. The main physiological effects of

electricity on the processes of secretion and excretion, is to increase their activity, and sometimes to modify their quality. A knowledge of these effects is indispensable in the consideration of pathological conditions and their electrical treatment, for where the functions of secretion or excretion are deranged, electricity is often of vital importance. In a number of instances I have known it to overcome urinary suppression of days' standing, and where the patient had been given over to death.

The physiological influence of electricity on the circulation is all-important.

True, its effects here with our present methods are not invaluable, but through its action on the cervical sympathetic, the arterioles and capillary circulation are appreciably influenced. I have seen the vessels of the retina both contract and dilate when the sympathetic has been galvanized; it is, however, safe to say that the effect of electrization is to raise the temperature by increasing the flow of blood, and to dilate the veins.

#### PHYSIOLOGICAL EFFECTS—A RESULTANT OF BOTH REFLEX AND DIRECT ACTION.

The physiological effects of electricity are evidently a resultant of both reflex and direct action. That its effects are partly and sometimes even wholly reflex, can hardly be doubted in face of the clear demonstrations afforded in the clinical study of electro-therapeutics. Persons who are peculiarly susceptible to electricity, or whose spinal cords are irritable, will not unfrequently observe tingling sensations and other evidences of disturbance in parts of the body far removed from electric excitation.

The circulation of one side of the body is appreciably affected when the opposite side is treated by electricity, and all the nerves of special sense are acted on both reflexly and directly. It is not to be understood that reflex supersedes direct action in producing electro-physiological effects, for quite the contrary is true; but in the treatment of all classes and conditions, this powerful reflex influence of the current should ever be kept in view. Especially in the electrical treatment

of children is it of supreme importance that this fact should be considered.

In early life the central nervous system is remarkably susceptible to all those forms of reflex influence that inevitably follow the processes of development.

Similarly, undue electric excitation of the peripheral nerves in infants and young children may be followed by much evil, have indeed been known to cause violent convulsive seizures.

#### THESE EFFECTS RESULT IN PERMANENT IMPROVEMENT IN NUTRITION.

As a result of the mechanical, chemical, and physiological effect of the passage of electricity through the body, we have stimulation, sedation, and permanent improvement in nutrition, and it is on the basis of its permanent tonic effect, and not on any mere stimulating or sedative action, that both central galvanization and general faradization have achieved their greatest successes in the diseases of children.

#### CHOREA.

In spasmodic affections in general, this power of electricity over the nutritive process is perhaps not so important a feature as its purely sedative and antispasmodic properties; but in chorea, which, although a spasmodic disease, is also frequently associated with impaired nutrition and nervous prostration, the powerful constitutional tonic action of electricity is imperatively demanded.

In regard to the prognosis of chorea under electrical treatment there has been much skepticism, even among those who are friendly to electro-therapeutics. This skepticism has been due to the fact, that the majority of cases of chorea recover spontaneously in time, and because their improvement under electricity is in some cases quite slow. One other circumstance that is not infrequently observed in cases of chorea, still further complicates the prognosis.

I refer to the numerous instances in which chorea of long standing and deeply seated, seemingly resists with great obstinacy every effort of electrical application, and manifest amendment only after the cessation of treatment.

In the treatment by electricity during the last nine years of many cases of chorea, I have, I feel confident, observed this tendency too frequently to doubt that the relation of the treatment and recovery (even in such instances) is directly that of cause and effect. It is hardly necessary to say that this conclusion, in order to carry conviction, should be based on cases of this disease that are of long standing and of a persistent type, and not on those transient choreic disturbances that are so familiar. We cannot, it is true, foretell, whether a case of chorea in its incipency will yield readily to ordinary remedies or to unaided nature, but it is safe to predict that it will, as a rule, recover in a few weeks under any judicious method of treatment, hygienic or medicinal; hence it is difficult here to determine the exact value of therapeutic measures.

There can, however, be but little difference of opinion in regard to the truth of the statement, that choreic symptoms, no matter how slight, when they persist beyond a certain period, say three or four months, are exceedingly intractable to our ordinary methods of treatment. These are the cases that test both the immediate and secondary results of electricity.

The disease has been successfully treated by various methods of electrization; by frictional electricity, peripheral faradization, and galvanization of the spine and central galvanization, but after a pretty thorough trial of all these methods, I have come to rely mostly on general faradization. Central galvanization, it is true, is often effective, and has been known to be of service after general faradization has failed, but I have no hesitation in saying that the powerful tonic effects of the last-named method can be more confidently relied on, and that it will more frequently prove of service after the failure of central galvanization than *vice versâ*.

Well-authenticated cases corroborative of this statement I presented to this society some years since, and at this time I desire simply to offer the following from a number of somewhat similar cases, as illustrative of the fact that I have just enunciated, namely, that in many conditions of disease, but especially in chorea, the application of electricity, when its immediate effect is not apparent, is often followed by secondary effects, that, in a reasonable length of time, result in complete recovery.

CHOREA OF OVER A YEAR'S DURATION—NO APPARENT IMPROVEMENT DURING TREATMENT—RAPID RECOVERY FOLLOWS ITS CESSATION.

The patient, a boy aged eleven, was directed to me by Dr. Geo. A. Peters. The choreic symptom, although not of an aggravated character, had persisted for over a year, with two or three brief periods of comparative exemption. All four extremities were more or less affected, but the improvement of the co-ordinary power was most marked in the arms. I submitted the patient to general faradization Nov. 19th, 1872, and up to Dec. 21st had administered fifteen applications, all by the above method with the exception of four séances of central galvanization, which were given for a time on account of some muscular lameness that was at first evidently caused by the mechanical action of the faradic current.

All this was followed by no apparent change in the choreic symptoms, but there was a perceptible improvement in his general nervous condition, sufficient to lead me to believe that beneficial secondary effects would soon be decidedly manifest. I so expressed myself, and was gratified to learn that improvement soon became manifest, and in a few weeks after the cessation of treatment the recovery was complete.

SPASM OF THE GLOTTIS.

This remarkable affection of childhood, which is usually associated with and often dependent upon, important processes of development, offers a fair field for electro-therapeutical research. Although it is regarded more as an accompaniment of a variety of disordered nervous conditions, than a purely local disease, it has nevertheless been successfully treated by localized galvanization alone.

The following suggestive case constitutes my whole experience in the electrical treatment of the disease.

RECOVERY OF AN APPARENTLY HOPELESS CASE OF SPASM OF THE GLOTTIS.

Harry H., aged eighteen months, was at birth unusually plump and vigorous, and for twelve months thereafter his health was perfect.

In his thirteenth month, and during the process of teething, he began to suffer from diarrhoea and irritability of the stomach that treatment failed entirely to allay, and at sixteen months the babe had lost much flesh and was far from well. About this time the mother noticed that the child would suddenly cease nursing, as if suffering for air, while the breathing would become almost croupy. The duration of these symptoms were, however, short, and the breast would be immediately retaken. For some time these paroxysms recurred but two or three times a week, and little importance was attached to them; but when, in the course of two or three weeks, they began to increase in frequency, the mother became alarmed and called in medical aid. The treatment adopted failed to relieve the symptoms in the slightest degree; indeed, the child grew decidedly and rapidly worse, and in the course of three weeks (April 17, 1874) the case fell under my observation and care.

At this time the paroxysms were recurring from fifteen to thirty times in twenty-four hours, and the child's strength was waning with fearful rapidity.

The attacks varied in severity, but in their worst aspect the head was thrown violently back, the face became livid, while rapid convulsive movements agitated the muscles of the face and neck, and suffocation seemed imminent. In from fifteen to forty-five seconds the spasm would yield, and with a loud expiration the attack would subside.

During the interval there was more or less spasmodic contractions of the muscles.

The thumb of the right side was drawn lightly into the hand, and the large toe of the same side was slightly adducted and flexed. During a paroxysm, however, the spasmodic action became quite violent, and painful to witness.

I submitted the little patient to localized galvanization, and in the following way:—

One pole (the anode), consisting of a flat disk one inch in diameter, and covered with flannel, thoroughly moistened in salt and water, was pressed firmly against the spine, close up to the occiput; the cathode of the same size was applied to the anterior portion of the neck, just above the sternum. The first application was with two zinc-carbon cells, four inches by two



in size, and continued for three minutes. No impression was made, and the child suffered as before. On the following day I increased the cells to four, and continued the application three minutes. The skin was decidedly reddened, but the child experienced no discomfort, and unfortunately no alleviation followed. On the third day five cells were employed for three minutes. The child was evidently annoyed by the burning sensation, and cried excessively.

For the next twenty-four hours the symptoms seemed to be somewhat aggravated, and the parents were loath to have me continue the treatment, and it was only after considerable deliberation that they consented to a further trial. I enlarged my electrodes somewhat, so that the current would be more diffused, and substituted for the flannel covering the softest and finest sponge that could be obtained, and for my small zinc-carbon cells I substituted four of the large original Bunsen's cells, and applied the current for two minutes, repeating the application the same day. On the following day I repeated the same application three times, the last séance being at four P.M.

At 9 A.M. the next morning, when I again saw the patient, he had suffered from but four spasmodic attacks, whereas the usual number between the same hours has been from nine to twenty.

For some ten days I repeated these applications three times daily, and with the most satisfactory results. The paroxysms decreased steadily in severity and frequency, and at the end of two weeks they had entirely disappeared. The child was necessarily, however, much prostrated. He suffered from profuse night-sweats, while his stomach was so irritable as to reject almost every article of food. I now submitted him to daily séances of general faradization, allowing him at the same time to drink freely of a weak tea made from hard-tack, which has been found to be a most admirable tonic and astringent for children. The little patient improved from day to day, and within six weeks from the time the above treatment was adopted his recovery was complete.

#### HOOPING-COUGH.

Whooping-cough would certainly seem to call for a trial of electricity, especially of central and localized galvanization, as clearly as any other form of spasmodic disease.

I have had the opportunity, in private practice, to test this method of treatment in five cases of pertussis, and in every case there was an undoubted modification of the violence of the paroxysms, and in two of these the course of the disease was clearly shortened. In all of these cases, I employed central and localized galvanization, using from four to six ordinary zinc-carbon cells, and repeating the applications once, and in a single instance three times a day. The case that derived the most benefit was treated three times a day.

#### TABES MESENTERICA.

I have treated a number of apparently marasmic cases, and various conditions of profound debility in children, with very satisfactory results.

In the early stages of marasmus, and not infrequently in a very advanced stage, the true character of the disease cannot with absolute certainty be determined. The only pathognomonic symptom of tubercular disease of a mesenteric gland is an enlargement that is perceptible to the touch, through the abdominal parietes, and as this symptom is rarely present until all hope is gone, it is difficult to arrive at satisfactory conclusions as to the real value of our therapeutic measures. Should not such results, however, as the following encourage further efforts in the electrical treatment of this condition?

#### MARASMUS IN A CHILD AGED THREE.—RECOVERY UNDER GENERAL FARADIZATION.

F. L., a little boy aged three, had been prostrated for some time by a severe diarrhoea, associated with fever. These symptoms became modified under treatment, but the child continued excessively weak, with no appetite, with paroxysms of feverishness, sleeplessness, profuse night-sweats, and progressive emaciation. No form of medication proved of much service, and as the condition of the patient pointed strongly to disease of the mesenteric glands, and as his condition was constantly becoming more hopeless, electricity was advised by both Dr. H. H. Gregory, the attending, and the late George T. Elliot, the consulting physician. At this time the little patient had been ill for nearly three months, and for the last month there had been manifest marked general atrophy and rapid failure of

strength. It was not positively determined that there was enlargement of the mesenteric glands, but there was such an unusual and persistent impairment of the function of nutrition, associated with the characteristic cachexia, that it was the unanimous opinion that the case was one of marasmus. The patient was immediately submitted to a mild but most thorough application of general faradization. It was at first exceedingly difficult to administer the treatment, because of the excessive sensitiveness of the body generally, and especially of the abdominal region, where it was particularly necessary to direct the application. In two respects the effects of these efforts were immediately and decidedly evidenced, viz., sleep was improved and the profuse perspiration was in a great measure checked. For fifty days this treatment was repeated every night. The child began slowly but surely to improve in every respect, and long before the expiration of the treatment he was out of all danger, and finally made a perfect recovery.

It is not always an easy task to thoroughly carry out a course of electrical treatment in the case of very young children. We cannot administer a dose of electricity as we do a dose of medicine. Time and a careful manipulation is required, that often severely tax the patience of the operator. Through fear and a refractory disposition, some children become so unmanageable, and throw themselves into such an excited condition, as to render it absolutely impossible to make the necessary applications. This, however, is not usually the case, for, contrary to the general belief, infants are relatively less susceptible both as to electro-muscular contractility and sensibility than adults; but I would here reiterate what I have already stated, that in childhood the central nervous system is highly sensitive to the reflex effects of electricity, especially the galvanic current, and care and tact is always called for in its application.

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A CASE OF INTERSTITIAL PREGNANCY. <sup>1</sup>

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By J. E. JANVRIN, M.D.,Assistant Surgeon to the New York State Woman's Hospital.

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MAY 23d, 1873, I was called to see Mrs. S. P. S. On my arrival found her suffering from severe uterine pains, of a contractile character, and accompanied by profuse flooding. She gave the following history of the attack.

Menstruated regularly the last time on March 20th, the flow continuing somewhat freer than usual for ten days; then ceasing for three or four days, was followed by a discharge of *pure* blood, at times chiefly clots, which continued, with slight interruption, up to the present date.

Three days since, after a cessation of the flow for five days, it returned, accompanied by severe contractile pains. A physician living in the immediate vicinity was called and prescribed opiates. Still the pain and flow continued.

## PREVIOUS HISTORY OF PATIENT.

Am thirty-three years old. Have been married sixteen years. Have had two children, one fifteen years since, the other thirteen years since. Both have since died. Six years previous to the commencement of this sickness had almost continuous flooding for a period of four months. Then consulted Dr. J. Marion Sims, of this city, who diagnosed a small pediculated uterine polypus. Made arrangements for an operation for its removal; a day or two prior to that appointed for the operation the polypus came away spontaneously. Since then, up to March 20th, 1873, have been in good health, menses perfectly regular.

On examination *per vaginam*, I found the uterus enlarged, about the size of a two months' pregnant uterus, apparently retroflexed, with the fundus well down in the hollow of the sacrum. Thinking from the history of the case that there might be another intra-uterine polypus or fibroid, I examined the cervical canal as thoroughly as practicable with the finger. External cervix well open, admitting the finger easily. Internal cervix firmly closed. I then introduced two fingers into the vagina,

<sup>1</sup> See August No., page 269.

and lifted the uterus well up out of the hollow of the sacrum. The pain was quickly relieved. Prescribed opiates and astringents internally, and decided to watch the case for any new developments. The discharge quickly subsided, and patient went along quite comfortably for two weeks.

*June 8th.*—Another attack, similar in all respects to that of May 20th, came on. Decided to have counsel, and invited Dr. T. G. Thomas to see the patient with me before resorting to any intra-uterine exploration. The following day Dr. T. saw her with me. Examination showed the uterus again apparently thoroughly retroflexed, somewhat larger than two weeks previous, very tender and sensitive to the slightest touch. External cervix open. Internal closed. Dr. Thomas suggested that it was probably a case of normal pregnancy in a retroflexed uterus, and that the uterus having fallen back again into the hollow of the sacrum, the pain and hemorrhage were due to the efforts of the uterus to lift itself out of its abnormal position.

The patient was placed in position upon the breast and knees, and Dr. T., introducing two fingers into the vagina, lifted the uterus as far up as possible.

*Perfect* rest was maintained for more than *two* weeks. The pain and flow gradually subsided, and at the end of the third day had entirely disappeared.

We of course expected that an abortion would follow after so much pain and hemorrhage. Instead, there were only occasional slight pains and flow, always of a bloody character, during the next three weeks.

*July 2d.*—Another attack, similar in all respects to the preceding, occurred. *Profuse* flooding, and excessive pain of a bearing-down and expulsive character. Feeling convinced that it could not be a case of normal pregnancy, continuing with such profuse hemorrhage, and also finding on several different examinations that the uterus had maintained its position well up out of the hollow of the sacrum ever since June 9th, and also finding the *left side and posterior surface of the uterus and cervix* apparently increasing in size. I again called Dr. Thomas in consultation. After a careful examination and a thorough review of the case, Dr. T. remarked that it was probably a case of pregnancy in the left Fallopian tube, and that it had fallen down into the *cul-de-sac*.

Feeling certain that there was no foetus in the uterine cavity, with Dr. T.'s assent I introduced the sound, and found the cavity three and a half inches in depth and extending toward the patient's *right* iliac region. During this examination the growth was found so closely blended with the uterus itself that I remarked to the Doctor that it seemed to me more like an interstitial than a tubal pregnancy.

I should here mention that we both noticed a semifluctuation in the mass, and this, together with other reasons mentioned before, made it pretty clear that it was not a fibroid. At the same time it seemed hardly probable that the uterine cavity would be three and a half inches in depth with an *extra-uterine* pregnancy of not more than three and a half months. After stating our opinion to the patient and her husband, and at the same time saying that we were not absolutely satisfied as to the true condition, it was decided to await any new developments.

During the following ten days there was at times considerable pain and also some hemorrhage.

*July 12th.*—Dr. E. R. Peaslee was added to the consultation. Dr. P. was informed as to the history of the case, but was kept in ignorance of our diagnosis until after he had completed his examination. It was his opinion that the mass was a rapidly developing fibroid, intra-mural; since the mass, in his opinion, was altogether too large for a pregnancy of any variety at three and a half or four months. He therefore advised non-interference.

Dr. Thomas and myself still feeling pretty well convinced that there was pregnancy, either tubal or interstitial, were in favor of exploring, by means of the aspirateur, through the *cul-de-sac*.

As I was to be absent from the city during the next two weeks, Dr. Peaslee kindly took charge of the case for me.

On my return, Aug. 1st, I received a note from Dr. P., he having gone to Newport a few days previously, stating that he felt very positive that it was a case of intra-mural fibroid; but that if it was not a fibroid it was probably interstitial pregnancy; for the mass was quite as large as an ordinary pregnancy at six months, filling as it did the whole pelvic cavity and rising up to the level of the umbilicus. He also suggested the possi-

bility of a double uterus and pregnancy of the *left half*, though not accepting that idea himself.

About Aug. 7th, four and a half months after the last regular menses, the patient told me that she thought she felt movements. I carefully watched the case during August and September, and at times felt almost certain that I could detect very feeble movements. The movements were so very feeble that I did not feel absolutely certain as to their existence, however.

During the first week of October, Dr. Peaslee again saw the patient with me, but saw no reason for changing his views as to his diagnosis as expressed in his letter of Aug. 1st.

At times I thought for a moment that I could hear the fetal heart, but I never felt absolutely certain as to this fact.

*Nov. 7th.*—The slight movements which patient had felt suddenly ceased. This was seven and a half months after last regular menses. The size of the mass at this time was about that of a normal pregnancy at seven months, the increase in size having been very little since Aug. 1st.

I had explored the cavity of the uterus twice since the last of June, once early in August, and again late in September, and found the depth just the same as in June, three and a half inches.

During this interval there had been no hemorrhage; the patient was quite weak, however, and confined to her bed the most of the time.

About the first of October she began to improve in general health. During November and up to the 19th of Dec., she had improved very much, the mass remaining about the size of a seven months' pregnancy.

On the night of Dec. 19th, just nine months from last regular menses, she was taken with very severe pains, resembling labor pains in every respect.

The pains continued at intervals of about an hour during the following forenoon, and were accompanied by quite profuse hemorrhage. I became more than ever convinced that there was interstitial pregnancy, and accordingly asked Dr. Peaslee to see her with me that afternoon.

Dr. P. introduced the sound during this examination, and after considerable manipulation, it passed in the same direction

as on my previous examinations, towards the patient's right side, and in front of the mass, to the depth of *five and a half* inches, two inches deeper than at any previous examination.

He still thought it more likely a fibroid than interstitial pregnancy, since the mass was rather small for a pregnancy of any kind at seven and one-half months, allowing that the child had died at the time when the movements ceased, and he considered the pain and flow only an attempt to re-establish the regular monthly discharge.

The pains gradually subsided during the night, the flow continuing for nearly ten days.

Being somewhat undecided as to the true condition, but feeling quite sure that it was either interstitial pregnancy or a fibroid, I determined to try the effect of hypodermic injections of ergotine, feeling sure that no harm could result from its use, and hoping that in either case it might have a beneficial effect in helping the uterus to contract upon the mass, and possibly aid in expelling it, or at least in diminishing it.

Began the use of the ergotine, January 2d, '74, the formula used being as follows:

℞ Bonjean's Ergotine . . . . . 3 iii.  
Glycerine,  
Aqua, āā . . . . . 3 vii ss.

Gtt. xv., hypodermically, every other day.

Continued its use every second day for three weeks, and then found that the mass was evidently decreasing in size. Had certainly diminished at least one-fifth of the size it was January 2d. The effect of the ergotine was felt very decidedly, as evidenced by strong contractile pains in the uterine, and pain extending down both sciatic nerves, particularly the left, after each injection. So severe were these pains that I resorted to the use of Magendie's sol. sulph. morphine, gtt. vii., with each ergotine injection.

*January 25th.*—The menses apparently came on and continued about one week. In the month of February there was no discharge. The mass was gradually diminishing in size, patient growing much stronger and able to take short walks out of doors. During all of the sickness up to March 1st, the bowels had been very constipated.

*March 2d.*—Slight diarrhœa; frequent, small, and offensive



discharges set in. Gave opiates and astringents, but with little or no effect in controlling the discharges.

On the night of the 12th she had several profuse and painful evacuations of a very offensive character.

On my visit the following day I found the mass greatly reduced in size, not more than one-third as large as it was the 1st of March.

I suspected that it was discharging through the rectum, and accordingly requested that all subsequent movements should be saved for me to inspect. On the following Sunday and Monday, 15th and 16th, quite a number of bones—the phalanges of the fingers—of a fœtus, apparently advanced about five and one-half or six months, were found in the discharges. Two days later three more bones belonging to the hand also came away: the whole number of bones passed being thirteen.

Discharges of very offensive matter continued during March and April daily. Sometimes as many as six or eight a day, and the comparatively small mass remaining after the profuse discharges of March 12th gradually subsided, leaving only a slight hardened mass around the posterior and left side of the uterus.

By examination with the finger per rectum an opening was found communicating with the sac in which the fœtus had been developed. This opening could barely be reached and touched at its lower border by the index finger. Through the opening could be felt soft shreds of broken-down tissue extending into the rectum.

The mass had become so small and felt so pulpy and soft that I thought the larger part of the bones of the fœtus must have been discharged on the night of the 12th, when the very profuse and painful discharges occurred, and had been thrown away without having been inspected. It is a matter of regret that they were not thoroughly examined.

During April and May the discharge continued offensive and thin. No more bones were discovered, though watched for constantly. During this time patient's general health improved considerably, and I hoped that she would ultimately recover. Toward the last of May she began to fail and show symptoms of blood-poison from the absorption of purulent matter.

I decided that the only thing to be done which offered an

hopes was to remove the remaining mass, either per rectum or vaginam, and in this view Dr. Peaslee coincided. Unfortunately the husband was away at the West on business, and she did not wish it done until his return; consequently the operation was delayed until June 9th. During this time she failed very rapidly, and on the day of the operation was so low that we feared she would hardly have strength to survive it.

Drs. Everett Herrick and Edward Bradley assisted me in the operation, Drs. Peaslee and Thomas also being present. After the patient was placed under the influence of ether by Dr. Bradley I easily dilated the sphincter ani and passed my hand up the rectum, gradually enlarging the opening from the rectum into the sac. I was somewhat surprised to find nearly all the bones of the foetus still in the sac. With very little difficulty they were scooped out by the fingers, and then the sac carefully examined. I could easily feel the roughened posterior wall of the uterus expanding itself to either side, more especially the left, and forming the anterior wall of the sac. The posterior wall was principally the anterior wall of the rectum; this, however, was augmented by the exudation and thickening which had taken place during the inflammatory attacks which had occurred early in the history of the case. Dr. Peaslee kindly examined the interior of the sac, by passing his hand, and confirmed my conclusions. There was no doubt that it was a case of interstitial pregnancy. The thickening and exudation which had accompanied the attacks of pelvic inflammation early in the history of the case had been sufficient to prevent a sudden rupture of the uterine wall, and not until the foetus had died and begun to decompose had the ulcerative process begun to work itself through and into the rectum.

The patient nearly died during the operation, although it lasted only from fifteen to twenty minutes.

By the use of stimulants, hot external applications, and the galvanic current, she reacted very slightly during the afternoon and evening, and became perfectly conscious. About midnight she began to fail and died at six the following morning (10th), some fifteen hours after the operation.

The bones removed comprise nearly the entire skeleton of the foetus, apparently of a foetus of not more than five and a

half or six months; still, the history of the case shows that it must have been at least seven and a half months old.

In looking up the history of interstitial pregnancy, I find two cases reported by J. Braxton Hicks, M.D., F.L.S., London, and as they fully prove the fact that interstitial pregnancy does sometimes occur, they are particularly to the point here.

I am indebted to my friend J. Foster Jenkins, M.D., of Yonkers, for a report of these cases.

CASE I.—In this case the uterus ruptured at the third month of pregnancy, the foetus escaping into the abdominal cavity and the mother sinking from the shock. This case is reported in Guy's Hospital Reports, vol. vi. of the third series, 1860, pages 272-280.

"The position of the foetus, and the condition in which the uterus existed at the time of death, is shown by an accompanying drawing.

"The following is a description of the dissection: uterus enlarged to six inches long, and three and a half to four inches diameter at the widest part. A ragged rupture appeared on the fundus, rather toward the left side, from which the blood had poured; the parts about the rent were highly congested.

"A section of the uterine walls showed their thickness had increased to about an inch and one eighth at widest part; numerous and large venous sinuses being noticeable, especially towards the fundus.

"A cavity, about three inches diameter (when collapsed) was situated in the substance of the wall of the fundus adjoining the left Fallopian tube: this cavity had distended the walls externally so as to be apparent there; and had also encroached on the cavity of the uterus on left side of fundus. The walls of the cavity all round were easily seen to be formed of the uterine tissue; and even at the thinnest part, where the peritoneum had given way, large bundles of muscular fibres could be recognized firmly attached to it.

"The wall separating it from the decidual cavity was very freely supplied by sinuses. The thickness of this part was about one-sixth of an inch when empty, but when supplied with blood it must have been much thicker. A distinct decidual membrane lined the whole interior of the uterus; that on the projection caused by the cavity simulated somewhat the decidua

reflexa. The microscopical characters of this decidual membrane precisely resembled the case above described (a case of tubal pregnancy also reported by Dr. Hicks in same paper), and could in no part of its elements be distinguished from true decidua. The cavity contained a foetus of apparently the size of the third month of normal pregnancy, with the appendages of the ovum as usual; the placenta was fully formed, and situated at the upper part of the cavity, as shown at (a) in the plate.

“The only part *not to be found* as in intra-uterine pregnancy was a deciduous membrane external to the chorion or placenta: of it there was not the slightest trace. The villi, as in the former instance, possessed only a single coat, and *spread over, but did not enter*, the uterine tissue to which they were affixed.

“No membrane at that part was to be detected. Beneath the inner surface immediately in contact with the villi, the uterine vessels spread themselves out, flattened, and so numerous that the whole substratum must have been almost as one blood-vessel, only the delicate membrane of the vessels separating the maternal blood from the villi, where they were in contact. The left ovary showed a very well-developed corpus luteum, whose cavity had begun to diminish.

“This case is instructive, and has some bearing on a practical point, in consequence of the nearly equal thickness of the walls of the cavity at the point of rupture, and at the part projecting into the uterus.

“Had the rupture taken place internally, would it not, in all probability, have been mistaken for an ordinary abortion? And had recovery then taken place, the true condition would have never been detected. It is more than possible that interstitial foetation may occur oftener than is supposed.

“We think it will be conceded that in the above cases the interchange of elements was carried on by an endosmotic action which took place between the two systems, by the simple apposition of vessels as above described; and therefore we must conclude, that a decidual membrane is not absolutely necessary to the foetal life. We cannot doubt but that the decidual membrane has an important use in the arrangement, perfect for its purpose, but it is not hence to be argued that it cannot be dis-

pensed with in some instances, and we are disposed to think, certainly in all interstitial, and from the above observations, very probably in all tubal foetations.

“The points deducible from the above examinations are:—

“1st. That the decidual-like membrane found lining the interior of the uterus in these cases is, in vascularity and microscopical structure, essentially the same as *true* decidua.

“2d. That in extra-uterine pregnancies a decidual membrane can be dispensed with.

“3d. That the delicate membrane-like layer lining the cavity in some cases of extra-uterine foetation is composed of elements differing essentially from those of the true decidua, and is derived from plastic lymph, and probably effused not long before the bursting of the foetal cavity.”

The second case reported by Dr. Hicks can be found in the ninth vol. of the *Transactions of the Obstetrical Society of London*, for 1867, pages 57–60.

I quote some of the principal points of this case.

“Mrs. F., æt. 35. A year before death (Dec. 1865) aborted at fourth month. No blood lost on this occasion. The body of foetus expelled one day, the next day the head; no trace of placenta found. Five and one-half months before death she conceived again. Dec. 8th, 1866, after some pain a foetus about the size of five and one-half months was expelled. No hemorrhage. The membranes not coming away, Dr. Puckle (the physician in attendance) introduced his hand and found a ragged opening with something soft in it. Thinking it safer to leave it, he did so. Patient went on well for four days; then violent bearing-down pains occurred, in the midst of which she complained of violent pain in abdomen. She became faint, with gaspings, and died in a collapsed state in two hours.

“Autopsy next day.

“On opening abdomen, clotted blood found diffused everywhere in the abdominal cavity. Removing clots, an unusual enlargement of right side of fundus uteri seen; large veins coursing over this enlargement beneath peritonæum. A rupture three-fourths of an inch long had taken place at its upper part. Blood had escaped through this, and placental villi could be seen through it. No adhesions anywhere. Body of uterus enlarged symmetrically, except as stated above. This extra en-

largement extended two inches upward. The blood-vessels over it very noticeable, some of them one-third of an inch in diameter. Walls generally about three-fourths of an inch thick. Cavity five inches long. At upper part, to the right, was an opening into the uterine cavity, ragged and sloughing, about two inches in diameter. Inside this opening could be seen the placenta, slightly decomposed. The walls of uterus were thickest near the lacerated opening. Large sinuses were seen in the walls, as in cases of ordinary extra-uterine pregnancy. Mucous membrane of the uterus *not* lined with any marked decidua. Pale towards the os uteri, but redder towards the opening referred to. Total length of uterus, externally, eight inches; diameter six inches. There was no communication between the two openings, but the placenta filled the cavity.

“From this it appears to me that intra-mural foetation had been formed; that it continued enlarging towards the peritoneal cavity and towards the uterine cavity at about the same rate, rather more towards the uterine, into which it bulged. This portion gave way, permitting the escape of the foetus, thus simulating an ordinary abortion.

“Upon this the uterus shrank and the tissue retracted, leaving the ragged edges as above mentioned. The placenta being a source of irritation, the contractions brought on a rupture of the peritoneal surface four days later, and the fatal hemorrhage.”

This second case of Dr. Hicks certainly shows that interstitial pregnancy may sometimes result in abortion, and he very truly remarks: “Had recovery taken place, the true condition would have never been detected.”

In Ramsbotham's *System of Obstetrics*, page 571 of the American edition, the following occurs:

“I believe we are indebted to Schmidt, of Vienna, for the first detailed account of this particular species”—interstitial or parietal foetation—“published in the first volume of the *Memoirs of the Josephine Academy*.”—Vienna, 1801.

“Carus, of Dresden, has given the drawing of a case which is reported by Hendrich; and Breschet has published a most admirable description of this species in the first volume of the *Répertoire d'Anatomie et Physiologie*. He names it “*graviditas in substantia uteri*.”

He then goes on to relate a case which occurred in his own

practice in 1820, similar in all respects to the first case reported by Dr. Hicks. He calls it "*parietal fetation*."

In Hodge's *System of Obstetrics*, 1864, Schmidt, of Vienna, is also credited with reporting the first case of this form of pregnancy in 1801.

It is further stated that, "M. Breschet, in 1824, published an account of all cases reported up to that time, some thirteen in number; since which about the same number have been recorded by different authors, leaving no doubt that such cases do occur."

"The cyst has been found complete, containing the fœtus, the membranes and placenta, often developed to a much greater size than that of the uterus, and yet no communication existing between the cavity of the cyst and that of the uterus.

"In one remarkable case, mentioned by Mr. Hay, of Leeds, the placenta, however, was said to be in the uterus, and the cord to pass through a small opening into the cyst containing the fœtus, constituting therefore a "utero-interstitial" pregnancy. The location of the cyst varies, being occasionally near the Fallopian tube, above or below it, and, in other instances, at or near the fundus. It is said to occur more frequently on the left than on the right side, in the proportion of five out of seven."

The latest allusion to this condition which I have found is in Schroeder's work on Midwifery, published at Bonn, 1872. From the German edition, page 217, I obtain the following:

"The criterion, also, which Poppel (M. f. G. B. 31, p. 208) mentions, that the decidua in the tube is less developed than in a rudimentary horn, cannot be decisive, because that portion of the tube running in the uterine wall itself also forms the decidua. In the remainder of the tube not only a thick decidua vera is formed (Hennig, M. f. G. B. 33, p. 265), but also a reflexa (Winkel, Tageblatt d. Rostocker Naturforschervers. 1871, p. 120, und Landon, Schmidt's Jahrb., 1871, B. 150, p. 53).

"Baart de la Faille (Verhandeling over Grav. tubouterina, Groningen, 1867, s. Schmidt's Jahrbücher, B. 135, p. 190) has collected and critically sifted the cases belonging to this kind of extra-uterine gestation. He comes to the conclusion that up to the publication of his article, sixteen cases had been reported in which the actual existence of interstitial pregnancy was beyond

doubt. They are the following: *Schmidt*, Beob. d. Med. Chir. Acad. zu Wien, 1801, I. p. 56 (s. Breschet, Mém. sur une nouv. espèce de gross. extraut. 1826, P. II., fig. 5); *Hedrich* (Horn's Archiv, 1817, p. 214); *Mayer* (Besch. einer Grav. interst. uteri. Bonn, 1825); *A. G. Curus* (Diss. de grav. tubo-uterina, Lipsiæ, 1841, p. 12); *Breschet* (l. c. p. 2); *Dance* (Breschet, l. c. p. 10, p. ii., figs. 1 u. 2); *Moulin* (Meissner, Forschungen, etc., 1833, iv. p. 87); *Breschet* (l. c. Obs. V.); *Auvity-Menière* (Archives générales, 1826, p. 217); *Hohnbaum* (A. G. Carns, l. c. p. 14); *Czihak* (Seanzoni's Beiträge, iv., p. 108); *Rosshirt* (Neue Zeitschr. d. Geb., B. ix., p. 400); *Vorndörfer* (Czihak, l. c., p. 107). This case is very uncertain, probably retention of the fœtus in the uterms. *Ramsbotham* (Med. Times and Gaz. 1855, p. 257); *Virchow* (Ges. Abh. p. 805); *Junge* (M. f. G. B. 26, p. 241)."

The above comprises the sixteen cases collected by *Baart de la Faïlle*.

"Since then—*Poppel* (M. f. G., B. 31, p. 208); *Braxton Hicks* (Transact. Obst. Society of London, v. 9, p. 57, 1867).

"*Lott* (Sitz.-Ber. d. Vereins d. Steierm. Aerzte, vii., 7, p. 64, s. Schmidt's Jahrb., 1871, B. 150, p. 50). *Probably* interstitial.

*Baart de la Faïlle* (l. c.) and *Schultze* (Würzb. Med. Z., iv., 1863, p. 178).

These two cases, according to Poppel, may perhaps be construed differently, the first as pregnancy in a rudimentary horn, and the latter as rupture of the uterms at an imperfectly developed spot."

Admitting that all the above cases were interstitial, we have twenty-one cases reported by Schroeder.

By some oversight the first case of Dr. Hicks, reported in Guy's Hospital Reports, vol. vi. of the third series, 1860, pp. 272-280, and which I have quoted at length in the early part of this paper, has not been referred to by Schroeder. With this case we have twenty-two cases up to 1872. During the preparation of this report I have heard of another case occurring in the practice of Dr. R. H. Fitz, Harvard Med. School, Boston, Mass., and from Dr. F., under date of Sept. 22, 1874, I learn that a report of his case will appear in Hay's *Journal of the Medical Sciences*, Phila., January, 1875. This case, together with my own, brings the number up to twenty-four at the present date.

As regards the pathology of this condition, the explanation



given by Braxton Hicks seems to me to be the most rational and conclusive.

In reviewing the case which I have reported, there are some points which it is well to particularize, and which seem to me to bear directly upon the question as to whether this was really a case of interstitial pregnancy.

1st. The fact that the mass, uterus and all, could during the early stages of the sickness, at least until four and a half months advanced, be lifted up *as a whole* from the hollow of the sacrum, and that at every examination it was readily acknowledged by each of the physicians who saw the case, that the uterus and growth, whatever the latter might be, were closely blended together and could not be separated at all, seems to me pretty good evidence that the growth was interstitial.

2d. The bones are not larger than those from a foetus of four months ; but the ossification indicates that of a foetus of at least seven months.

3d. The small size of the foetus, as indicated by the small size of the bones, can, I think, be explained by the fact that in interstitial pregnancy there is no decidua and no maternal portion of the placenta, as shown in Dr. Hicks' first case, and therefore, much less perfect arrangements exist for the nutrition of the foetus than in normal pregnancy.

4th. The large size of the mass (at four months), as we have seen, can be accounted for only by the very great thickness of the uterine wall (in Dr. Hicks' first case, one and an eighth inch at three months), and also from the thickening resulting from peri-uterine inflammation, which in my case was quite marked. This exudation was so great that, as the ulceration occurred, and the foetus made its way through to the rectum, the peritonium had become so changed, and everything so thoroughly agglutinated, that there was no renewal of the peri-uterine inflammation in an acute form, and no evidence of shock.

5. The fact that labor-pains came on at exactly the normal time (nine months), is also, in my opinion, pretty good evidence that the foetus was inclosed in uterine tissue ; still, my chief reason for believing it interstitial is the fact that during the removal of the foetus I could pass my fingers over the posterior wall of the uterus and distinctly feel it widely spread out, and

forming the anterior and left side of the sac. By passing the uterine sound into the cavity of the uterus while the hand was still in the cyst, this was easily demonstrated by both Dr. Peaslee and myself.

As to the effect of hypodermic injections of ergotine. In my opinion the expulsion of the fœtus was hastened very materially by their use. This is a point which admits of doubt; still, the contractions of the uterus following its administration, and the gradual diminution in size of the mass before its expulsion, show that if there was any effect from its use it was certainly of a beneficial character.

I can only add that I very much regret that I did not remove the bones of the fœtus some weeks earlier. If I had done so, possibly the result of the case might have been different. Their removal some four weeks earlier would have given a better chance of recovery; still, at that time the patient seemed improving in strength, and I did not deem it justifiable to interfere. It was only about ten days previous to the fatal issue, and when symptoms of septicæmia showed themselves, that it became evident that the putrefying mass must be removed.

If I should ever see another similar case, I would remove the fœtus as early as possible after the opening had established itself, whether the opening was into the rectum or vagina.

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## LACERATION OF THE CERVIX UTERI AS A FREQUENT AND UNRECOGNIZED CAUSE OF DISEASE.

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(Read before the Medical Society of the County of New York, September 28, 1874.)

It is now nearly twelve years since I first recognized the importance of this injury from parturition, as a cause of subsequent diseases, and the difficulty of relieving certain effects until the cause had been fully appreciated.

In my clinics at the Woman's Hospital I have for years past demonstrated, by an operation, its practical bearing, and have frequently called the attention of the profession to the necessity for surgical interference under certain conditions; yet the

operation is still but little practised or its importance appreciated.

Previous to my own observations, I believe that no one had placed on record his recognition of the lesion as a cause of uterine disease, or had advocated the necessity for repairing the injury after its reception.

Lacerations of the cervix are of frequent occurrence, and are seldom recognized, even at the time of labor. The tissues are then so soft that, without the rent has passed beyond the cervix into the vaginal and connective tissues, it can scarcely be detected by a mere digital examination, and will escape observation unless an unusual amount of hemorrhage should exist as a consequence.

Lacerations in the median line are the most frequent, while through the anterior lip they are of more common occurrence than in the posterior one. When in the median line, and confined to the cervix, these lacerations generally heal rapidly, leaving scarcely a cicatricial line to mark their course. This is due to the fact that with the necessary recumbent position of the patient, which is enforced for some time after labor, the raw surfaces are kept in close contact by the pressure of the lateral walls of the vagina, until they have become firmly united. We have, therefore, no serious consequences likely to follow the accident, unless the rent passes beyond the cervix. If through the anterior lip into the vesico-vaginal septum, the tear may extend even to the neck of the bladder, producing at first an extensive fistula. But as no sloughing or loss of tissue has taken place, and the edges lie in contact, the divided septum rapidly unites, from before backward toward the uterus. The laceration through the cervix closes as readily from the vaginal surface toward the bottom of the fissure, and union with the line through the septum may in a short time reunite the entire tract of laceration. This will frequently be the result if attention has been paid to cleanliness, and if a phosphatic deposit from the urine on the raw surfaces has been prevented by the frequent use of injections of tepid water into the vagina. As a rule, however, we will have one of two forms of vesical fistula remaining as a consequence of the injury.

The most frequent result is for the fissure through the cervix to close entirely, with some portion of the laceration in the

vaginal septum, leaving a small vesico-vaginal fistula in front and against the anterior lip of the uterus. Occasionally the entire line of laceration through the septum will unite with that through the cervix down to the angle at the bottom of the fissure, but leaving here a sinus along which the urine escapes from the bladder into the uterine canal at or above the internal os. Several cases of this description are detailed in my work on *Vesico-Vaginal Fistula*,<sup>1</sup> where, to remedy the difficulty, it was necessary to reproduce the original condition through the cervix, and after removing the tract of the sinus, the whole was brought together by interrupted sutures. Lacerations through the anterior lip are found generally in women who have borne a number of children, and with great relaxation of the abdominal parietes there existed anterior obliquity of the uterus.

Lacerations through the posterior lips unite as readily, and the occurrence may not be suspected unless the fissure should have extended sufficiently into the posterior cul-de-sac to set up an unexpected attack of inflammation. When cellulitis occurs at this point and from this cause, we always have a most intractable form of retroversion to deal with afterward. If extensive, the cicatricial band, felt as a cord, will contract, and so shorten the cul-de-sac as to render it impossible to adopt any instrument, for the purpose of restoring the uterus to its natural position, until a surgical procedure has been resorted to for its removal. The history of these cases would indicate that the occurrence of the injury was due to the presentation of the vertex towards the sacrum.

In practice, we have to deal chiefly with the consequences of lateral laceration, and the effects are more marked when the lesion is complete than when confined to either side. Partial lateral laceration of the cervix will sometimes partly fill up by granulations, especially if the injury was confined to one side, but never so perfectly that the line cannot be easily recognized. Whenever the rent has extended to the vaginal junction, or beyond, there will exist a tendency for the tissues to roll out, from within the uterine canal, so soon as the female assumes the upright position. The posterior lip of the cervix naturally catches on the posterior vaginal wall, as the uterus after a

<sup>1</sup> *Vesico-Vaginal Fistula, from Parturition and other Causes, with Cases of Recto-vaginal Fistula.* William Wood & Co., N. Y. 1868.

recent delivery is still larger than natural and low in the pelvis from its increased weight. So soon as the flaps formed by the laceration are once separated, their direction of divergency becomes increased by the anterior lip being crowded forward in the axis of the vagina, towards its outlet, in the direction presenting the least resistance, while the same force naturally crowds the posterior lip backward into the cul-de-sac. From thus forcing the flaps apart, a source of irritation is at once established, which arrests the involution of the organ, and the angle of laceration soon becomes the seat or starting-point of an erosion which gradually extends over the everted surfaces. With the increased size and additional weight of the uterus from congestion, the tissues gradually roll out to the internal os. The whole organ being in a state of fatty degeneration, and the tissues of the neck soft, these flaps flatten against the posterior wall of the vagina or floor of the pelvis so that all appearance of laceration becomes lost. So perfect is the deception that it is frequently impossible, for any one not familiar with the condition, to recognize the existence of a laceration by an ocular examination alone. When the laceration has been complete, but confined to one side, the rolling out is not so extensive, nor is the apparent size of the cervix so large, as in the previous condition, but it is as often difficult at first sight to detect the injury. Naturally a partial obliquity of the uterus in the pelvis is produced by crowding the cervix towards the uninjured side, that this surface and the flattened lacerated portion may present a common plane to the posterior wall of the vagina on which it rests. This portion of the uterus presents a reflexion of vaginal tissue over a part of its body, just above the terminating point of the laceration, so that in appearance the length of cervix on that side is equal to the uninjured portion. The apparent os is always more patulous than in health, and this condition is readily accounted for from the evident existence of disease within the uterine canal. Moreover, the deception is still maintained by the passage of the sound as it is introduced within the canal at some distance from the apparent edge of the cervix. In fact, it enters and follows the oblique course of the laceration, from the vaginal junction, but gives no evidence of the true position of the uterus in the pelvis, although the sound passes in the

axis of the vagina. So deceptive is the condition that I have been frequently consulted as to the propriety of amputating an enlarged or elongated cervix when I have readily demonstrated the true condition, and proved that, were a small portion only of the apparent enlargement removed, the peritoneal cavity would be necessarily opened. The cervix is never so large as it seems to be, and the line of junction with the vagina is equally deceptive, for as the uterus prolapses from increased weight, it carries with it a reflexion of vaginal tissue. It is a wise procedure, in any doubtful case, to place the patient for examination on her knees and elbows when, on the introduction of the speculum, by atmospheric distention of the vagina, and by the action of gravity on the uterus, the true line of junction with the vagina will be well marked. In a case of laceration on one side, extending to or beyond the vaginal junction, the fissure can be detected generally in this position without difficulty, as by the weight of the uterus its axis in the pelvis will be brought in line to correspond with that of the vagina. Lateral lacerations of the cervix are more frequently found after instrumental delivery, than as the result of labor which has been terminated by the efforts of nature alone, and yet this may be but a coincidence.

After the reception of this injury, and consequently a "bad getting-up" from her confinement, the female will at length consult her physician in consequence of her inability to stand with comfort, complaining of a continual backache, with pains down her limbs, a profuse cervical leucorrhœa, and, as a rule, hemorrhagic and frequent menstruation. The probabilities are that she will be faithfully treated for both ulceration and prolapsus, in mistaking the effect for the cause. The "ulceration," which will seem to be the most prominent feature in the case, will likely baffle all attempts to heal it, or if any improvement should take place in her condition, after a sufficient rest in the recumbent position, a relapse will follow again and again after attempting to exercise. We find frequently laceration of the perineum in these cases, and as the vagina was unable to regain its natural size after delivery, from the then existing prolapse of the uterus, the canal becomes still more dilated, as the organ, from a want of proper support, continues to advance as a wedge towards the vaginal outlet. The necessity for correct-

ing the position of the uterus is apparent, yet to give adequate support to the organ any instrument used must necessarily be so large as to allow the vaginal walls to prolapse, so as to obstruct the circulation, and by thus increasing the weight of the uterus add to the difficulty. Such a case will pass from one physician to another, until eventually the leucorrhœa will cease, and the profuse menstruation diminish as the surfaces become cicatricial in character from the frequent use of the nitrate of silver or from the application of caustics. But she becomes gradually a confirmed invalid, the hypertrophy remains, and with the impairment of her general health the nervous element becomes most prominent.

When the case has been left more to the reparative powers of nature, the mucous follicles gradually undergo cystic degeneration, and these little bodies can be felt as a number of shot embedded in countless numbers within the tissues of the cervix. These become distended, rupture, and gradually empty themselves, by which the follicles are destroyed as the cavities disappear by contraction. At first the cervix is rather hypertrophied from the filling of these cysts, and as the inflammation and enlargement of the follicles extends within the canal, the rolling out of the mucous membrane is increased. The cervix, however, and frequently the uterus itself, gradually become atrophied from the pressure exerted at first by the enlargement of the cysts, and afterward by the contraction following their rupture. Occasionally the atrophy is confined entirely to one flap, and when thus limited it is generally to the anterior one. Eventually the female will frequently cease to menstruate at rather an early period in life, and will then gradually recover her health, or, as the alternative, phthisis will become developed.

November 27, 1862, I first operated for the relief of a double lateral laceration of the cervix by freshening the surfaces, and bringing together the anterior and posterior flaps with interrupted silver sutures. This patient had been an invalid for several years before coming under my care, and had been treated for menorrhagia and hypertrophy of the uterus with an extensive erosion. She was undersize, of a naturally delicate constitution, and after a severe and protracted labor, with difficulty had given birth to a large child. Her general appearance

indicated incipient phthisis, but no evidence of a tuberculous deposit could be detected. The uterus was some four inches in depth, and an erosion extended about two inches in diameter, over an enormous cervix. With great care this erosion had been healed several times, by maintaining the recumbent position for a sufficient length of time, but a relapse to the former condition recurred in each instance shortly after beginning to exercise by walking. I had almost despaired of being able to offer her any permanent relief, and attributed my want of success to the condition of her general health. While making a digital examination one day I was puzzled to account for the greater width of the cervix in comparison to that of the body beyond, and a condition I had for the first time appreciated. I placed her on the left side, and with Sims' speculum brought the cervix in view. I drew the posterior lips forward towards me with a tenaculum, but with no special purpose, when I was surprised to observe that it had decreased to nearly half its previous size. On lifting up the anterior lip with a tenaculum, in the other hand, so as to bring the two portions in approximation, the outline of a cervix presented, of nearly a normal size. The difficulty was at once apparent, for the parts had rolled back within the uterine canal, and a deep lateral fissure became evident, which extended on each side entirely through the cervix and beyond the vaginal junction. On separating the flaps and forcing them back to their former position, I saw the tissues gradually roll out, and the cervix again present its previous appearance. There could then be detected no appearance of laceration, and with the reduplication of vaginal tissue over the sides of the uterus, as I have already described, the cervix presented a normal length above its apparent junction with the vagina. The remedy at once suggested itself; the operation was performed with the aid of my assistant, Dr. G. S. Winston, and I believe Dr. T. G. Thomas was also present. On completing the operation, the uterus was five inches in depth, it rapidly reduced in size, and in time all evidence of local disease subsided, but she never entirely regained her general health. Some seven years after the operation, Dr. F. N. Otis, of this city, her family physician, detected a tuberculous deposit, and she has died of phthisis within a few months, having been ten years under my observation. For



two years previous to her death she had resided abroad, but, as a friend, I was kept advised of her condition, and she continued free from uterine disease. I am fully satisfied, at the time of the operation her condition was so critical that it would have been but a question of a few weeks before a tuberculous deposit would have taken place. Although she never recovered fully the loss of vitality to which this injury had reduced her, yet her life was beyond question prolonged many years by the operation.

I have now performed this operation nearly two hundred times in my private and public hospital practice, and it has been witnessed by so many of the profession that I feel it would add but little value to offer in addition a record of cases, where one instance would be but a type of the whole. I can in truth state, with the proper preparatory treatment, and the requisite care after the operation, that it has never been performed without ultimate benefit. Occasionally, secondary hemorrhage has occurred, necessitating the use of a tampon, by which the integrity of the sutures have been more or less implicated, requiring afterward a portion of the line to be closed by subsequent operation, or left to fill up by granulations. The operation has been singularly free from any subsequent inflammatory complications, and in but one case has pelvic cellulitis occurred. During a portion of the past winter there existed at the Woman's Hospital an unusual tendency to inflammation, which frequently followed any simple exciting cause. After waiting until it was deemed safe, I operated on a patient in the institution for the relief of the injury under consideration. The operation was followed by a very severe attack of pelvic cellulitis, and her condition did not admit of the removal of the sutures for some four or five weeks after their introduction, but she recovered, and the operation was successful.

My first operation enabled me to appreciate the same condition, in a degree, as a result of the lateral division of the neck of the uterus, as practised for the relief of flexure, when the incision has remained patulous beyond the crown of the cervix. Fortunately, however, the ingenuity of man has not yet been able to devise any means by which the divided surfaces could be kept from uniting, so far, that we seldom have after the operation the tissues rolling out to the same extent as when

laceration has occurred. Nor are the parts in the same favorable condition, to admit of this gaping, as after child-birth, when the flaps flatten and roll out readily. Yet with the same forces in action as I have already described, they are often quite sufficient, when the operation has been even but partially successful, to separate the flaps far enough to prove a source of irritation. An erosion is thus frequently caused after the operation, which is difficult to heal, and the irritation of itself will bring about hypertrophy of the whole uterus which cannot be reduced until the divided surfaces have been reunited.

Every case of laceration is benefited by some preparatory treatment previous to the operation. The uterus, from its increased weight, and while resting on the floor of the pelvis, will, by traction on the cellular or connective tissue, obstruct sufficiently the circulation, to produce not only increased congestion of the organ itself, but also in the neighboring tissues. To give tone to the vessels and relieve the congestion, it is necessary to place the patient on her back, with a bed-pan under her, and have administered a vaginal injection, night and morning, of at least a gallon of hot water, at about 100°. The uterus is to be lifted from the floor of the pelvis by means of an india-rubber inflated ring pessary of a proper size. The advantage of the instrument is that if it is introduced with the flaps of the laceration in contact, and the uterus anteverted, they cannot again separate. Any downward pressure has the tendency to crowd the cervix toward the opening in the centre of the ring, while the aperture is not large in diameter to allow any portion to pass far enough to become strangulated. The instrument should be by no means the size of the already overstretched vagina, for if it were it would but dilate it the more. It is to be used merely as a temporary cushion: and as there will likely be a laceration of the perineum, which will allow of a prolapse of the vaginal walls, the instrument must be kept in place by a T bandage. In addition to the vaginal injections, the local treatment will consist in the application of a solution of tannin in glycerine every other day, and about once a week the subsulphate of iron or Monsel's salt. These applications should be made just after the vaginal injections, and on removing the secretions, with a syringe, as thoroughly as possible; the parts should be well dried by means of small pieces of old

linen laid between the flaps, and removed as the application is made. It is advisable to separate thoroughly the flaps before applying the preparation of iron, that the powder may be dusted over the whole denuded surface; but afterwards they must be brought together, with the uterus anteverted, and the patient kept in the horizontal position for some hours. When the circumstances are such that the patient is unable to keep quiet after the application, it is a good plan to place in the posterior cul-de-sac a proper-sized pledget of damp cotton, with another in front of the anterior lip. These cotton pledgets are for a day or two to take the place of the instrument, which would be injured by contact with the iron, while at the same time they will protect the patient's linen. As a rule, I leave the tampon undisturbed for forty-eight hours, and have the vaginal injections omitted for the same length of time. This treatment may be followed for a month at least previous to the operation, which had best be performed just after the menstrual period.

So long, however, as there can be detected, by pressure from the finger, any tenderness in the neighboring connective-tissue, it is not safe to operate. We may feel satisfied fully that a certain amount of cellulitis has previously existed, and a condition is still remaining which would require but a slight provocation to re-establish the inflammation, were we to disregard this warning.

My mode of operating is to place the patient on the left side, and to use Sims' speculum, or some other perineal retractor to bring the parts in view. The operation can be performed sometimes on the back, as the vaginal outlet is large and the uterus so low that it can be readily drawn outside and returned after the operation. But the left side has the advantage, were there no other, that while in this position there can be less rolling out of the tissues except when the patient is placed on the knees and elbows. The first step is to bring the flaps together in apposition, and while they are lifted up by means of a double tenaculum in the hands of an assistant, the instrument known as the uterine tourniquet is slipped over the cervix below the point of vaginal junction and tightened. The object of this instrument is to control the hemorrhage, during the operation, which is sometimes excessive without its use.

Until recently I have used a portion of twisted wire, such as is usually furnished for the *écraseur*, the two ends of which were passed through a canula. The loop was slipped over the neck of the uterus, while being held up by an assistant, and tightened by sliding the canula down the wires held in the other hand. As soon as the cervix was compressed as much as possible by this means, the ends of the wire were bent back and several times wrapped around the end of the canula so that they could not slip. Within a few years I have had the instrument constructed, which I have referred to, by using, instead of the wire, a portion of watch-spring passed through a canula, with the application of the double ratchet of the *écraseur* to tighten the loop about the cervix. Just before constricting the neck, I take the precaution to draw up, with a *tenaculum*, through the loop sufficient vaginal tissue all around the cervix that the flaps may be brought together easily, while the fold thus formed renders the instrument less likely to slip over the cervix when it has become reduced in size from the escape of blood during the operation. Then, after separating the flaps, the surfaces which have been lacerated are to be freely denuded from one lip to the other, leaving a broad undenuded tract in the centre, from before backward, which is to form the continuation of the uterine canal to the os. The greater the hypertrophy of the organ the more necessity there will be for leaving the canal and outlet large, or both will be too small when the uterus regains its normal size. A difficulty is sometimes experienced in bringing together accurately the vaginal edges of the flaps, in consequence of the great thickening in the central portion, which will be found dense and filled with cysts. It is necessary to remove this tissue freely, and from the opposite side to which it is to be united, so that the two freshened surfaces will correspond in width. Either the scissors or the scalpel may be used to freshen the surfaces, but I prefer the former, from the greater rapidity with which the tissues can be removed. While the tourniquet is being held by an assistant, to steady the uterus, the portion from the flap to be removed is secured by means of a *tenaculum* in the hand of the operator. At the outer angles of the fissure, just at the vaginal junction, it is necessary when freshening the surface to remove very superficially the tissues at these points. The cir-

cular artery is seldom ruptured when the laceration takes place, from its elasticity and position in loose connective tissue, but as the parts contract after cicatrization, it is frequently left just at the termination of the angle of the fissure with the vaginal tissues. The most difficult step in the operation is the introduction of the sutures, from the great density of the diseased uterine tissue and the mobility of the organ. The first suture should be passed through the anterior flap, close along the bottom of the fissure, and withdrawn just at the edge of the undenuded strip left to form the canal, again to enter at a similar point in the opposite lip, so as to make its exit on the vaginal surface of the posterior flap corresponding with the first point of entrance. From three to four sutures are generally needed on each side. The last one, through the crown of the cervix being more superficial, is easier of introduction, but needs be passed with more care than the others, with the view of accurately approximating the edges at the os and along the vaginal surface from this point. Before securing the sutures already passed, those for the opposite side must also be introduced, or great difficulty will be experienced. Should there, however, be an unusual amount of bleeding, it can be arrested by only twisting the interrupted suture nearest to the bottom of the angle. But it is even better, before doing so, to see if it cannot be controlled by tightening the tourniquet, which may have become loosened in consequence of the shrinkage of the neck from the escape of blood confined within the tissues when the instrument was first applied. The same plan is followed for securing the sutures, as recommended by Dr. Sims for the operation of vesico-vaginal fistula. The needle is armed with a short silk loop, and after its introduction the silver wire is then attached and drawn through to take its place. The ends of the wires are seized by a pair of forceps and twisted over the "shield," but before being freed from the former they should be bent over flat by means of a tenaculum, used as a fulcrum, under the suture at the end of the twist close to the line of union. If bent over properly, so as to lie close to the vaginal surface, and cut off at half an inch in length, the sutures may remain undisturbed for an indefinite time, but they are generally removed on the eighth day. When the sutures are withdrawn the precaution must be taken to cut the nearest portion of the loop so that it will continue to bind the parts in

apposition until it has been drawn out. It is best to remove first the suture nearest to the vaginal junction, for if there should be any tendency to gap in the line, the others can be left for several days longer, so that the ununited portion may heal by granulation.

When the laceration has been confined to one side it is necessarily more difficult, in comparison, to denude thoroughly the angle at the bottom of the fissure, as well as to introduce the sutures with the same accuracy, than would be the case where both sides of the cervix have been laid open. Fortunately, however, it is not so necessary that the sutures should be passed to the edge of the uterine canal, where but one side of the neck is to be united. The main point is to secure on the vaginal surface as perfect a line as possible, for when the two surfaces thus brought together have been freshened to about the same extent, the parts will be kept sufficiently in contact that the line within the uterine canal will be, in all probability, as perfect as that secured by the sutures.

If the general condition will admit of the confinement, it is better that the patient should remain in bed for some ten days after the sutures have been removed. She will need no local treatment beyond resuming again her hot-water vaginal injections which are generally omitted after the operation, until the sutures have been removed, that she may be kept as quiet as possible so long as there is no vaginal discharge. During this period, however, if a necessity exists for their use, one or two pints of water will be sufficient, to which it is well to add a little castile soap. After the sutures have been removed, the uterus will decrease rapidly in size if there exists no cause of irritation to arrest its progress. To favor this change an early resort to some mechanical support is advisable to lift the uterus from the floor of the pelvis, and to keep the organ anteverted if possible. Some modification of Hodge's open lever pessary I have found to answer for the greater number of cases. The instrument should be made with a curve long enough to go well up into the posterior cul-de-sac, and at least half an inch beyond the uterus, for if too close at this point it will by pressure obstruct sufficiently the circulation about the cervix to increase the hypertrophy of the whole organ. The pessary should be as small a one, both in length and width, as will accomplish the

purpose, that the vagina may gradually recover from its overstretched condition resulting from the previous prolapse. So soon as the patient has sufficiently regained her health, and other circumstances will admit of doing so, the lacerated perineum should be closed, and, if necessary, the operation on the vaginal walls should be performed for restoring the canal to its normal size. On her recovery from the operation, it will then be a question of judgment as to the necessity for some modification in the size and shape of the pessary which had been previously worn, or as to the propriety of discontinuing its use. As a rule there will be no need for any local treatment to the uterine canal, for with the improvement in the patient's general condition all discharge will cease, and the organ will gradually regain its normal size.

NOTE.—With the consent of Dr. Emmet we append the following remarks, which were made by Drs. J. Marion Sims and Horace T. Hanks after the reading of the above paper at the meeting of the Medical Society of the County of New York, Sept. 28th, 1874, and which were kindly furnished us for publication by their authors :

Dr. J. MARION SIMS said: When I went abroad in 1862, amongst the patients I turned over to the care of Dr. Emmet was the lady whose case forms the basis of the paper he has just read. She belonged to the upper walks of life, and had been under my charge for twelve or eighteen months. I remember the peculiarities of her case, so well described by Dr. Emmet, as vividly as if it were but yesterday. The bilateral laceration of the cervix, and the consequent eversion of the hypertrophied, congested cervical mucous membrane constituted at that time a difficult problem to solve. During the whole time that I observed this case no benefit resulted from local treatment, and I am sure that nothing short of the method so successfully adopted by Dr. Emmet could have been of the least service to her. I now only wonder that this operation had not been worked out sooner. When the perineum is lacerated, the necessity for its reconstitution is self-evident, and it is singular that the necessity for reconstituting the integrity of a lacerated cervix did not sooner force itself upon the surgeon. The operation as devised and practised by Dr. Emmet is as simple, as safe, and as certain in its results, as is the operation for a simple case of vesico-vaginal fistula. The same principles underlie each. The same free denudation of tissue, the same method of suture, the same after-treatment, and the same security from danger, belong to both alike.

I have performed the operation often enough to speak in positive terms of its value. The discussion of the subject must, of necessity, be one-sided. There can be no objection, no opposition to the operation. We must accept it as Dr. Emmet has given it to us. We can't modify the operation; we can't change it; we can't improve it—for it is perfect, perfect in its method, and perfect in its results.

We owe to Dr. Emmet a debt of gratitude for this valuable contribution to uterine surgery. Like all new operations it is likely to be abused, but the time

will soon arrive when it will assume its place in the foremost rank of useful improvements.

After the subject had been discussed by other members of the society, Dr. Marion Sims rose again, and said: I am personally so impressed with the importance of Dr. Emmet's paper in a practical point of view, and so pleased with the manner in which he has presented it to our consideration, that I beg leave to move a formal vote of thanks to Dr. Emmet for his most valuable contribution to surgery.

This motion being seconded was carried unanimously.

Dr. H. T. HANKS said: Mr. President, and gentlemen, I took occasion this morning to consult the record-book for diseases of women in Demilt Dispensary, where I am one of the attending physicians, believing it would confirm the conclusions drawn by the author of the paper this evening. I have not been disappointed. Many of us have not realized that this lesion described by Dr. Emmet is a common one. It is only a few winters since that I saw Dr. E., at the Woman's Hospital, point out some of the direct results of lacerations of the cervix uteri, and skilfully perform the operation for its cure. Since then I have been struck by the frequency of the lesion, both in public and private practice. During the five months ending August 31st, 1874, I treated in the department for diseases of women at Demilt Dispensary, 254 cases. Deducting 25 which were not truly uterine, leaves a total of 229 *strictly* uterine. Of these, 19, or over 8 $\frac{1}{10}$  per cent., were suffering from laceration of the cervix uteri. In 4 of these 19 cases, there was sub-involution of the uterus; in 9, there were granular erosions, more or less severe. In 3 cases, displacements occasioned indirectly by the laceration of the cervix. Thus we see that these statistics emphasize and corroborate the conclusions deduced this evening by Dr. Emmet.—ED.

## SPECIAL POINTS IN SPENCER WELLS' OVARIOTOMY OPERATIONS, WITH REMARKS UPON THE OPERATION IN GENERAL.

' By B. F. DAWSON, M.D., New York.

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(Read before the New York Medical Library and Journal Association, Nov. 6, 1874.)

It was my good fortune during the summer of 1872, and again during the one just past, to be invited by Mr. Spencer Wells to witness him perform several ovariectomy operations. So many points in his method of operating struck me as of such great importance, and as not generally known, that I have thought it would be neither unadvantageous nor uninteresting to present them to the attention of such members of the profession as take an interest in ovarian operations.



Having been present at and assisted in many operations—over sixty in number—performed by many of the most distinguished ovariotomists in this country, as well as by others of less note, and having carefully studied and noted the peculiarities and methods of each, I feel I am not presumptuous if I venture also to make a few pertinent and critical remarks upon an operation that as yet I have never performed myself.

Passing at once to the subject of my paper, the first point I wish to call attention to is Mr. Wells' particularity in limiting the number of persons present at an operation. Although I have seen him operate eight times I have never but once seen as many as that number present, and generally not more than three or four outside of his assistants. This limitation is obviously advantageous, in preventing the operator or assistants being crowded upon, or their attention disturbed by conversation, and is in strong contrast with operations I have seen frequently performed in a room crowded to such a degree that both the operator and his assistants, especially the administrator of the anæsthetic, have been literally leaned upon by those anxious to obtain a peep at the operation, and the attention of the former more or less necessarily distracted by conversation directed to them or to one another by those present.

Mr. Wells is also particular in his hospital operations, that none shall be present who are at all likely to bring infectious germs into the operating room, obliging the strangers he may have invited to sign a paper to the effect that they have seen no case, or been in any place, which will render them liable to bring such germs in their clothing. Now this seems to me to be a most valuable precaution, and in strong contrast to other ovariotomists. Certainly there must be some risk to a patient submitting to such an operation, especially in having, in the confined atmosphere of the operating room, and perhaps in contact with her, even a single person whose clothing is conveying infectious germs; and may it not be asked, with some force, if not a few cases of dangerous or fatal peritonitis or septicæmia after ovariotomy have been due to the presence at the operation of some physician fresh from a case of erysipelas or puerperal disease, or a medical student whose clothing is saturated with the foul atmosphere of the dissecting room. Certainly this point is worthy of careful consideration.

Perfect quiet and avoidance of all excitement of the patient is also considered of great importance by Mr. Wells, and he therefore allows no one to be present until the patient is fully anæsthetized, or to remain in the room during her return to consciousness. This avoidance of excitement both before and after the operation, he also further insures as much as possible in the selection of the anæsthetic and its administrator. For the former he gives preference to the bichloride of methylene, or chloromethyle, as ensuring rapid and easy anæsthesia, rapid recovery, and greater freedom from the nausea and vomiting so generally following the use of other anæsthetics, and in the selection of a skilled administrator he is assured of its proper and careful use. Here, again, it seems to me is an important point, for I am inclined to think the success of many protracted cases are impaired by want of attention to such precautions. How many deaths after ovariectomy have resulted from the exhausting vomiting due to ether I am not prepared to say, but if the facts could be known, I am afraid the number would be many, for after no operation is the act of vomiting more injurious to the patient. Again, how often could this risk have been avoided had the anæsthetic been administered carefully and judiciously, so as to keep the patient simply insensible, and not narcotized as I unhesitatingly state I have seen in more than one instance, owing to the fact of the administrator being inexperienced in his duties, or so absorbed in the operation as to have his attention drawn away, only to have it recalled by a word of admonition, or the absence of respiratory efforts by the patient.

The anæsthetic always used by Mr. Wells is one that, from his endorsement alone, should have the preference to all others, and it may not here be out of place for me to digress and make a few remarks upon its merits, specially as I can speak with some authority, having given it very many times in ovariectomy and other operations.<sup>1</sup>

Since 1867, bichloride of methylene has been extensively used in many of the largest hospitals of Europe, as well as in the practice of many English surgeons, by many of whom, notably Mr. Wells, it is considered superior to all other anæ-

<sup>1</sup> For further particulars see paper by the author in the New York Medical Record for May 15th, 1874, on the "Use and Comparative Merits of the Bichloride of Methylene as an Anæsthetic."

thetic agents. It has the single disadvantage of being very expensive, and difficult to preserve, from its liability to deterioration by exposure to light and air.

It is best administered by the apparatus known as Junker's, by means of which air is forced through the methylene, and conveyed to the patient for inspiration. Administered by this apparatus a patient may be kept in a state of perfect insensibility to pain throughout a prolonged operation; scarcely any of the vapor can escape into the room, consequently neither the surgeon nor administrator can be affected by it; and the quantity inspired by the patient is wholly under control of the one administering it.

Its effects are similar to those of chloroform, but anaesthesia seems to be much more readily induced by it, and is decidedly more easily recovered from. In fact, its action seems to combine the best properties of ether and chloroform.

According to Mr. P. Marshall,<sup>1</sup> the time required to put a patient under its complete influence was from  $3\frac{1}{2}$  to 7 minutes, and the quantity used only 2 to 7 drachms.

In 123 cases reported by Mr. Richard Rendal,<sup>2</sup> the ages varying from 6 months to 70 years, anaesthesia was produced in 30 seconds in 18 cases; in 60 seconds in 70; in 2 minutes in 25; in 3 minutes in 5; in 5 minutes in 3; and in 9 minutes in 2 cases. Of these 123 cases, 50 recovered in 1 minute; 23 in 2 minutes; 9 in 3 minutes; 28 in 5 minutes; and 11 in 10 minutes. In my own experience, as shown by the records of cases, anaesthesia was invariably induced within 2 minutes, the longest being 8 minutes—one case that had previously resisted the effects of ether. Recovery was always correspondingly quick.

Its effects upon the pulse are, at the outset, to decidedly stimulate and strengthen it; but it soon returns to about its normal state, and never in my experience has fallen much below its normal rapidity or strength. This statement is also supported by the testimony of Mr. Rendal,<sup>3</sup> who attributes its safety to this stimulating action on the heart, and also to its rapid elimination, as shown by the rapidity with which patients recover from its effects.

<sup>1</sup> British Medical Journal, December 7, 1867.

<sup>2</sup> British Medical Journal, October 16, 1869.

<sup>3</sup> Loc. cit., page 413.

Its effects upon the pulse in the five cases reported by Mr. Marshall, already referred to, were as follows: in 3 it ranged from 65 to 80; the others offered a marked contrast, for in them it ranged from 114 to 120.

In fifteen cases of my own, of which a careful record of the pulse was noted, the following was the lowest the pulse ranged: In three, 75; in five, 80; in three, 84; in two, 88; in one, 98.

Its effects upon the respiration are somewhat similar to chloroform. In no case have I seen other than full and quiet inspiration and expiration, and that these functions are properly performed is attested by the generally unaltered color of the skin and lips, which even in some cases I have seen increased to a clear scarlet. This testimony is also supported by that of others, especially Mr. Wells,<sup>1</sup> who has used it over four hundred times, and says: "The patient very seldom becomes pale, sleeps quietly, wakes quietly, and seldom has much bronchial irritation."

The nausea and vomiting usually following recovery from chloroform and ether, especially the latter, is of much less frequency and severity. In regard to this point Spencer Wells also says: "It is quite true that it has the disadvantage of causing occasional nausea and sickness, but in my experience this is almost always the rule with chloroform (and sulphuric ether), whereas, with chloromethyle it is certainly exceptional."<sup>2</sup> Mr. Rendal also states that "no sickness or headache follows, unless inhalation has been continued" for some time. In his one hundred and twenty-three cases referred to, vomiting occurred in fifteen only, one in eight. In my own experience, in thirty-one cases in which I administered it, nausea or vomiting ensued in but six, and these were after prolonged operations.

In regard to safety, Mr. Rendal says: "I have not had a fatal case;" and Mr. Wells likewise writes that in over three hundred and fifty cases in which he had used it, "in very few of these operations was insensibility to pain maintained for less than five minutes—in a few it was kept up from forty-five minutes for one hour or more—yet I have never been at all uneasy during the administration or from any subsequent effects fairly referable to it, whereas, with chloroform I never felt quite at ease; and although I have never lost a patient during

<sup>1</sup> Diseases of the Ovaries, Am. edition, page 335.

<sup>2</sup> Loc. cit.

operation, I have three times had to resort to artificial respiration, and I have very often seen patients *suffer so much from chloroform vomiting* that the result has been imperilled, and in some cases *a fatal result has been in a great measure due to this vomiting*. When I add that between April, 1870, and March, 1871, I had thirty-two successive cases in private practice without one death, and that in the last twenty-four cases of the fifth hundred, including both hospital and private cases, every patient did well, it must be admitted (as anesthesia was complete in every case, not one patient having been conscious at any stage of the operation) that the anæsthetic is a good one." In fact I can bring no more forcible arguments as to the advantages of chloro-methylene than by again quoting Mr. Wells, in conclusion, who says: "Indeed the patient has all the advantages of complete anesthesia, with fewer drawbacks than I have ever obtained by the use of any other anæsthetic."

Reverting again to the proper subject of this paper, I will simply note the fact of Mr. Wells always securing the patient from all movement by fastening her to the table by straps attached to the legs and arms. In the event of unexpected return to consciousness, she is thus prevented from impeding the operation.

A procedure which struck me as both unique and novel, Mr. Wells resorted to in a case where the tumor was found closely adherent anteriorly and to the edges of the abdominal incision. Instead of endeavoring to separate the cyst in the usual way, he emptied it at once, enlarged the opening, and seizing the inner surface of the cyst with a strong pair of forceps, just beyond where it was adherent, made firm traction, thereby inverting the sac and liberating it from its adhesion to the abdominal walls, the last portion to come away being that attached to the abdominal incision. By this procedure considerable time and trouble were saved, and the possibility avoided of peeling off the abdominal peritoneum instead of the cyst in endeavoring separation from the edges of the wound first, after the usual method. The possible objection that there might be danger of engaging intestine or omentum in the bite of the forceps, Mr. Wells refuted as impossible if proper caution was used. He stated that this method was one he has frequently resorted to, and had always found answered admirably.

Immediately on the tumor being emptied, Mr. Wells is exceedingly careful that no blood or cystic fluid enters the peritoneal cavity, and to this end has his assistants sponge the wound carefully and compress the lips closely together, at the same time that they are held up, and their edges kept dry while he is busy adjusting the clamp. This precaution I have never seen taken by any other operator, but it seems to me worthy of note, for if we limit the entrance of blood or cyst fluid into the peritoneal cavity, we avoid tedious and injurious sponging out of the latter, danger of peritonitis or septicaemia, to say nothing of saving the time consumed in so doing.

Being assured of the cessation of all bleeding from the wound and points of adhesion, Mr. Wells places a large flat sponge within the abdomen, for the purpose of protecting the intestines and catching any drops of blood following the sutures, and proceeds to close the wound by silk sutures. He uses Chinese twisted silk, in pieces about eighteen inches long, armed at each end with a long stout straight needle. Placing one of the needles between his lips, he passes the other through the edge of the lip of the wound farthest from him as he stands at the patient's side, passing it so close to the edge as to barely enclose more than peritoneum and cutis. Taking the needle off this end, he next passes the other through the opposite lip. Each suture is taken by an assistant and by their means the lips of the wound firmly upheld until all the sutures are passed. The large sponge is then withdrawn and the wound closed.

In closing the wound Mr. Wells takes special care that it is tightly closed about the pedicle, so that it will not be possible for any blood, or secretion from the decomposing stump, to enter the peritoneal cavity, and to guard against this always uses a clamp that will limit as much as possible the spreading of the pedicle. This point, it seems to me, is an all-important one, and one, I am sure, that has not been sufficiently attended to. May it not be questioned if not a few dangerous and fatal cases of peritonitis and septicaemia have been due to the fact that septic material has found its way into the peritoneal cavity through an opening incautiously left alongside of the pedicle, or necessitated from the use of a clamp that spreads out the pedicle to such an extent as to render perfect closure impossible?

This point has so often impressed itself upon me, and also

the inadequacy of most of the clamps in use to favor a perfect closure of the wound, that I was induced some time ago to devise an instrument which, while combining simplicity and power of compression, would at the same time so constrict the pedicle as to favor the most perfect closure of the abdominal wound; in other words, a clamp that compresses the pedicle in a line with the abdominal wound. This clamp having been used by Mr. Wells and others, seems, by meeting with their approval, to answer fully the purposes for which it was devised.

The last step in Mr. Wells' method worthy of note, is his manner of dressing the wound and bandaging the patient. A few crystals of perchloride of iron being applied to the pedicle, strips of folded lint are carefully adjusted beneath the clamp around the pedicle, and pads of the same over the wound; these serve to soak up whatever secretion may occur. Large pieces of cotton wool are next placed over the entire abdomen, and the same kept in place by broad strips of adhesive plaster, which also tend to support the abdominal walls. Over all he passes a broad flannel bandage pretty snugly.

Before the patient comes out of the anæsthetic she is placed in a bed, always in the same room; those present at once retire, the room is darkened, and the patient left alone with her nurse.

The foregoing points in Mr. Wells' method of performing ovariotomy; seem to me to be worthy of special consideration: the avoidance of all prior and subsequent excitement of the patient; attention to the purity of the atmosphere in which the operation is performed; the inducement of rapid and quiet anæsthesia, and the insuring an equally quick and quiet recovery to consciousness; avoidance of all causes likely to interfere with the careful and rapid performance of the operation; caution as to the entrance of blood or fluid into the peritoneal cavity, and, not least, the insuring of a perfect closure of the abdominal wound.

I am well aware that most of these points are not unknown, but as Mr. Wells is the most successful of all ovariotomyists, I have thought it not unlikely that much of his success was due to his careful attention to the foregoing points, which I have never seen receive the same attention from other ovariotomyists. I have, therefore, called the attention of the profession to them that some might approve or disprove them by such criticism or discussion, as they are far better able to do than myself.

THE IMMEDIATE TREATMENT OF SUPERFICIAL RUPTURES  
OF THE PERINEUM.

By DR. M. D. MANN.

Physician to the New York Dispensary, Department for Diseases of Women.

NOTWITHSTANDING all that has been written in regard to the prevention of rupture of the perineum, very little has been said about its immediate treatment. My object is, therefore, to call more particular attention to the advantage of the immediate treatment of superficial ruptures, and to illustrate the method now so successfully employed in the great lying-in hospital in Vienna.

Ruptures of the female perineum may be divided into three classes; the superficial, central and deep. It is only the first class, or superficial ruptures, with which we have now to deal. Under this head we include all ruptures or lacerations which, extending through the fourchette, do not reach farther than the sphincter ani muscle. The laceration of the fourchette, which occurs in almost every first labor, is to be excluded, as being almost unavoidable and quite unworthy of notice. It is a little hard to draw the line between this laceration of the fourchette and true rupture of the perineum. Practically only those ruptures are worthy of notice, as entailing possible bad results, which extend to the centre of the perineum. This is the standard adopted in practice in Vienna, though it must be modified to suit cases. If the perineum is very long, say one and a half inches, and there is a great difference in this respect in individual cases, a wound which does not reach to the point named will be large enough to demand appropriate measures for its cure.

The frequency of this accident is very much greater than is generally supposed. Schröder,<sup>1</sup> after careful observation, gives as an average 9% in multiparæ and 34.5% in primiparæ. Ols-hausen<sup>2</sup> says that among primiparæ in at least 15% of the cases a considerable rupture is unavoidable. In the lying-in-wards

<sup>1</sup> Schröder Geburtshülfe, p. 559.<sup>2</sup> Volkmann's Klinische Vorträge, No. 44.



in Halle, he says that although the greatest care is taken to preserve the perineum according to the most approved methods, during the last ten years rupture has taken place in 21% in primiparae, and in 4.7% in multiparae. In another hospital he saw fifty-six ruptures in 119 first labors (47%). Snow Beck saw seventy-five large ruptures in 112 cases, all primiparae, or 67%.

In the records of the Vienna hospital, which, through the kindness of Prof. Braun, I was allowed to examine, among 688 primiparae, there were thirty-eight ruptures recorded, which is only 5.6% or one in about every nineteen cases, and two in 780 multiparae.<sup>1</sup> This gives us only 2.7% for all cases taken together, a very small percentage as compared with that reported by others, and from my own observations, probably very much below the truth. The returns are left to the midwives, who are very careless in reporting cases which might bring discredit on themselves. An average between these different estimates will give us 33 per cent. for primiparae, which agrees very well with Schröder, and may reasonably be adopted as a fair general average. This is certainly much more frequent than is generally taught. Most of our English text-books do not more than allude to the subject, some do not even notice it. In none of them, so far as I have observed, is the frequency of the accident insisted upon, except in Simpson.<sup>2</sup> He gives no percentage, but says that it is of "very common occurrence, especially in primiparae labors." Bedford, Duncan, Tyler Smith, and Cazeaux make little or no mention of the subject. In a late edition of Cazeaux, revised by Tarnier, it is introduced in a note. Leishman, the author of the latest, and in many respects the most complete work on midwifery, alludes to the subject in such a desultory and haphazard manner that the student would readily be led to pass it over as of no consequence. He does not allude to the treatment, at least I failed to find it, although on page 206 he promises to do so later on. Hodge, Meigs, Churchill, Murphy and Barnes, although devoting some space to rupture do not give at all a fair idea of the

<sup>1</sup>I append fuller notes of the cases. Total, 1,468; 688 primiparae, 780 multiparae. Ruptures, 40; primiparae, 38; multiparae, 2. 1 rupture followed version; 5, forceps; 2, breach. 3 were past the sphincter. In 7 no serre-fine was used. Average number of serre-fines used in each case, 2.6.

<sup>2</sup>Simpson's *Obstetrics*, etc., p. 152.

frequency of its occurrence. The ideas prevailing among the profession are in accord with those held by the writers of the text-books, as would naturally be expected. As a rule with us the perineum is never exposed during labor, nor is it examined afterwards to see if it has sustained any injury. Thus the majority of ruptures are overlooked and the general ignorance of the subject perpetuated.

The causes of rupture may be classified under three heads. 1st, A relative disproportion between the size of some portion of the child, either the presenting part, or some part which passes later, and the diameter of the opening of the vulva. This will include all monstrosities, mal-presentations, deformities of the child, and an unnaturally small ostium vaginae. 2d. Any condition of the perineum causing a weakening of its elasticity or resisting power, as œdema, varices, condylomata, rigidity, old cicatrices, etc. 3d. Undue violence of the expulsive effort, as in precipitate labor, not giving the parts time to dilate and expand sufficiently. We might add a fourth head, which would include carelessness or ignorance on the part of the attendant.

Many perineæ are ruptured by a careless delivery of the shoulders after the head has safely passed. The improper use of instruments must also account for a certain number of cases.

Primiparæ are more liable than multiparæ, although it is by no means safe to suppose that after the first labor all danger is passed. The first child is commonly smaller than the second or some succeeding child, and while the small head may pass with safety, the larger will prove fatal to the integrity of the parts.

The dangers resulting from rupture are either immediate or remote. Hemorrhage, inflammation, abscess, and sloughing, have all been recorded as complicating the injury. The lochia flowing over the raw surfaces give a certain chance for septic absorption. Again, ulcerative and diphtheritic processes sometimes attack the unhealed surfaces and prove very difficult to treat. A certain amount of swelling and tenderness attends every case.

The secondary dangers are derived from the loss of support to the lower portion of the vagina. That this plays a very important part in the production of some forms of uterine disease, is now generally admitted. It has been asserted that sterility

may result from the weakening of the ostium vaginae, allowing the semen to flow out too soon. A recently deceased practitioner of this city used to declare that the operation for ruptured perineum was justifiable merely from a social stand-point, in order to prevent divorce.

Notwithstanding all these possible dangers, it cannot be denied that in a proportion of cases the accident does very little harm. The patients go through life with very little or no suffering or inconvenience from it. The probable and possible dangers and inconveniences are, however, so numerous that we are not justified in taking any risks by leaving a rupture uncared-for.

Under the head of treatment may first be mentioned prophylaxis. A proper management of the labor will prevent a large proportion of possible lacerations. It fails, however, quite often, for in some women the disproportion between the diameter of the head and the size of the opening through which it is to pass is so great that something must give way, and this is, of course, the comparatively soft and fragile tissues which go to make up the perineum, rather than the unyielding bones of the head.

Let us suppose, then, that rupture has taken place, what can we do? The first step is to recognize the existence of the abnormal condition, and to see that the tear is of sufficient size to make treatment advisable. In view of the statistics here given, and in view of the testimony of all operating gynecologists, and of the records of all dispensaries where the diseases of females are treated, as to the frequency of this accident, is it too much to say, that after labor every primipara, at least, should be examined *by the eye*, or if this is too much, by the touch, to see that the perineum has sustained no injury? Even if the tear be so slight as to need no step to promote union, it should be treated to prevent suppuration. Modesty and indifference, we will not say ignorance, prevent this in a great majority of cases, and so the patient and her attendant both remain ignorant of the laceration until she finally presents herself for the treatment of a prolapsus, cystocele, rectocele, displacement, or some other form of uterine disease, which is either caused or complicated, or rendered worse by the loss of the proper vaginal supports. That this does occur is the everyday experience

of those treating uterine disease. Every gynecologist has seen cases where neither the woman nor her attendant were conscious of the "tearing" at the time of its taking place.

We will take for granted, now that the accident has occurred and has been recognized. Two plans of treatment are open to us. Either we may attempt to gain union by *prima intentio*, or we may wait until the puerperium is completed, and then resort to the operation of perineorrhaphy. As to the advisability of immediate treatment, authors are divided, some declaring that the tissues being torn and not cut, and from their being bathed by the lochial discharge, urine, etc., primary union is impossible. The falsity of this view is, however, abundantly proved by facts. Many cases have been reported where spontaneous union has occurred; and in central rupture, where motion between the wounded edges is in a great measure prevented by the condition of the parts, union occurs in almost every case, a fistulous opening being a very rare occurrence. "in consequence of the edges of the lacerated wound, almost always perfectly uniting under common surgical care and treatment subsequent to delivery."<sup>1</sup> Joulin also affirms that in central rupture spontaneous union is the rule. The wound, in fact, bears much closer resemblance to a clean cut than to a lacerated wound. The great tension of the parts causes them to give way suddenly, generally in a straight line, without any special bruising of the edges. If the edges are cleansed and properly adjusted, in the course of a few hours the surfaces are glazed, and a sort of union takes place which prevents—provided perfect quiet of the wounded surfaces on each other is obtained—the lochial and other discharges from interfering with the remainder of the process. Another evidence that primary union is possible, is the good results obtained in a certain number of cases by the method of treatment I am now about to detail. This method has the merit of simplicity, and can be used in all slight cases.

It consists only in drawing the ordinary obstetric bandage well down over the hips, and then applying a light bandage around the knees, or putting a garter around each knee, and then tying the two garters together. Motion is thus in a great measure

<sup>1</sup> Simpson, loc. cit., 593.

prevented, and in a certain number of cases union takes place. This plan is, however, uncertain in its results. The wounded surfaces are liable to slip on one another, and union may take place in this position with the surfaces unevenly applied. "Unfortunately, in the great majority of instances our attempts will not be rewarded by success."<sup>1</sup> Sometimes only the lower angle will unite. The need of absolute rest and the inability to move the lower extremities is very irksome to the woman. For "this plan should be pursued for ten or twelve days."<sup>2</sup>

The next method of procedure is much more effective than that just described, though much more difficult of accomplishment. It consists in the application of the quilled or interrupted suture, in short, the operation of perineorrhaphy. This is generally recommended in England, Germany, and this country, whenever immediate treatment is advocated.<sup>3</sup> It certainly answers all the indications, and if properly introduced "will succeed in a great number of cases in obtaining union by *prima intentio*."<sup>4</sup>

It possesses, however, great innate disadvantages. "Sutures add to local injuries, and are not unapt to generate an erysipelatous propensity in the parts."<sup>5</sup>

Joulin declares that after labor the sensibility of the parts is very great, and the patient bears any operation very badly. It presupposes a certain amount of surgical skill not possessed by every practitioner, and if not well done is worse than not at all. Without the use of an anæsthetic it is very painful. It causes a great amount of unnecessary alarm and magnifies what is not a dangerous accident into something "so severe that the woman must be sewed." If we use an anæsthetic the anxiety is still more increased. Thus the physician comes to be severely blamed—through perhaps unjustly—for allowing the patient to be injured. Again, the patient is tormented with the idea that a very painful operation, the removal of the stitches, is before her. This fear, together with the fear that she will not be cured, and will have to be again operated upon, may, in a nervous subject, cause such an amount of mental anxiety as will materially retard her convalescence.

<sup>1</sup> Thomas' Diseases of Women, 1874, p. 129.

<sup>2</sup> Ibid.

<sup>3</sup> Barnes, Simpson, Scanzoni, Simon, Schröder, Thomas, etc.

<sup>4</sup> Schröder, loc. cit., p. 561.

<sup>5</sup> Meig's Obstetrics.

So much for the two methods now in common use; one does too little, the other too much.

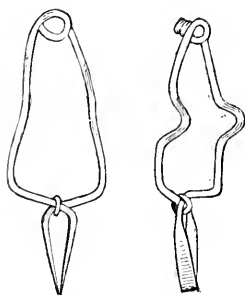
The Vienna method seems to stand between the two, preserving the advantages of the one and possessing none of the disadvantages of the others.

It consists in the application of *serrefines* to the parts so as to keep the edges fixed and in place, until union has occurred. The only authors, as far as I am able to find, who mention the use of these little instruments, are Jonlin<sup>1</sup> and Barnes.<sup>2</sup> The former recommends their use, and the latter rejects them as inferior to sutures, though he does not pretend to have tried them.

The advantages, in the first place, are that a more perfect coaptation of the parts is attained, the patient is not confined to any one position, easy movement in bed being quite permissible.

It requires no special skill or practice, for its use causes no pain, no undue alarm, no anxiety. The use of the instrument can be justified on the plea of a slight tear which would be better healed than not, without magnifying the accident or making it something more than it really is. No anæsthetic is required, and only a very limited amount of exposure. The whole thing is completed in one or two minutes.

As to its sufficiency it may be well to remark that there is very little tendency in the wound to gap, but rather for the wounded surfaces to slip on each other. This is entirely obviated by fixing one or two points of the skin opposite to each other. It is not necessary that the whole thickness of the flaps should be fastened, and it is certainly better if the same result can be obtained without the perforation.



The *method of application* is very simple. The patient being placed on her side with her back toward the operator, the buttocks are brought near to the edge of the bed, and the thighs flexed strongly on the abdomen. The parts are thus brought within easy reach without unnecessary exposure. The

<sup>1</sup> *Traité complet d'Acouchements.* Paris, 1867.

<sup>2</sup> Barnes' *Obstetric Operations.*

surfaces are then properly prepared by checking any hemorrhage which may exist and by removing all clots. The serrefines are then made to grasp both edges as deep as the length of their arms will allow, about half an inch. It may be necessary, in exceptional cases, to trim off the ragged edges. Immediately after labor the parts are very much relaxed, and no difficulty is found in finding tissue enough. One hour after the birth of the child, just before the attendant leaves the house, is the time best suited for the application. The interval between the instruments should be about half an inch, so that two or three are generally enough, unless the perineum be uncommonly long. It is better to put the first one a little below the angle of the wound, and the upper one a little above the upper or lateral end, the third or fourth, if necessary, being placed between them.

As to the instruments, they should be strong enough to hold themselves in place, but not so strong as to cause pain by pricking, or to cause ulceration. The points also must not be made too sharp.

The general experience in the Vienna Hospital is so satisfactory that the chief assistant declared that they expected to cure every case. This certainly was not in accordance with my observation; but from the notes of the following fourteen cases it will be seen that union took place in every favorable case, and where the necessary conditions were complied with.

For those cases which are more serious, where the sphincter ani is broken, and perhaps the recto-vaginal septum is involved, the deep sutures are commonly employed, as also where the line of rupture extends around the anus, nearly to the coccyx, as in one case which came under my observation. Such cases are fortunately rare. Among the forty cases recorded above, it occurred only three times—that is, including the case where the line of rupture went around the anus.

The method of treatment above described is that adopted in Vienna. It would undoubtedly add to its efficacy if some parts of the first-described method were adopted in addition. For instance, the knees should be tied loosely together, and the patient kept quiet. As to subsequent treatment, it might be well to confine the bowels by small doses of opium, if necessary, until the third day, when they should be opened by an

enema, to avoid straining. The serre-fines should be kept on 48 hours, and then removed.

The use of the catheter for a few days, although not necessary to a successful result, might add to the comfort of the patient. It is not necessary to confine the woman to her side, as easy movements, enough to change the position, may be allowed.

The following cases illustrate both the condition of success and failure:—

CASE I.—Primipara, æt. 25. Labor lasted 20 hours. Child, boy. Rupture slight. Two serre-fines applied. Quite healed.

CASE II.—Primipara, æt. 28. Labor, 14 hours. Boy. Rupture quite to sphincter. The woman was under my care. Just as the head was coming over the perineum, she threw herself suddenly to the farther side of the bed, and bore down violently, although she had been warned not to do so. Three serre-fines applied. Quite healed.

CASE III.—Primipara, æt. 29. Labor, 27 hours. Boy. In this case there was great œdema of the vulva. The forceps were used. The head passed safely, but the shoulders ruptured the perineum quite to the sphincter. No serre-fine used. Edges took on a diphtheritic action, and healed very slowly. No closure of the rupture.

CASE IV.—Primipara, æt. 34. Labor, 12 hours. Girl. Rupture quite to the sphincter. Three serre-fines. Rupture partially healed leaving a fistulous opening near the bottom of the wound, which finally healed by granulation.

CASE V.—Primipara, æt. 26. Labor, 16 hours. Boy. Two serre-fines. Forceps were used in approaching powerless labor. The serre-fines were not put on until the morning visit, 12 hours after the occurrence of the accident. No union.

CASE VI.—Primipara, æt. 22. Labor, 21 hours. Boy. Rupture slight. Union complete.

CASE VII.—Primipara, æt. 26. Labor, 21 hours. Girl. Rupture quite to sphincter. The woman was very unmanageable, and no serre-fine was used. No union.

CASE VIII.—Second child. Labor, 20 hours. Girl. Rupture quite to sphincter. No serre-fine. The woman ordered to lie on her side and keep as quiet as possible. Slight union of lower angle.



CASE IX.—Primipara, æt. 25. Labor, 17 hours. Boy. Rupture to sphincter. Three serre-fines, applied 9 hours after labor. Union partial, less than one-half of wound united. Enough to be of benefit.

CASE X.—Primipara, æt. 24. Labor, 36 hours. Boy. Rupture to sphincter. Three serre-fines, fourteen hours after labor. Union partial.

CASE XI.—Primipara, æt. 24. Labor, 17 hours. Boy. Rupture about two-thirds of perineum. Three serre-fines, 1 hour after birth. Union perfect.

CASE XII.—Primipara, æt. 22. Labor, 16 hours. Boy. Rupture to sphincter. Three serre-fines, 3 hours after labor. Union perfect.

CASE XIII.—Primipara, æt. 24. Labor, 21 hours. Boy. Rupture not quite to sphincter. Perineum long and soft. Two serre-fines only. Union perfect.

CASE XIV.—Second child, æt. 22. Labor, 14 hours. Boy. Three serre-fines, 8 hours after birth. There was in this case an old rupture which had healed.

The proportion of successes is only one-half, but in all those where union did not take place, there is good and sufficient reason to account for the bad result. In two cases (7, 8), no serre-fines were used; in three (5, 9, 10), they were put on too late and in one (3) œdema rendered any attempt at union useless.

From the accompanying figure a better idea can be derived of the instrument than from a description.

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#### A NEW UTERINE DILATOR.

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By C. D. PALMER, M.D., Cincinnati, Ohio.

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CINCINNATI, OHIO, *September 3, 1874.*

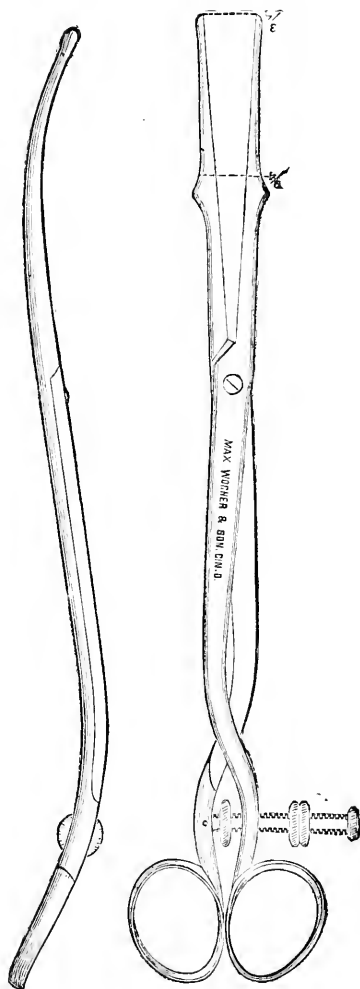
DR. PAUL F. MUNDE,

EDITOR OBSTET. JOURNAL.

DEAR SIR: Since the publication of my paper on "New Uterine Dilator," in your last number, Mr. Max Woche has made for me another pattern, which I think is superior to any yet devised.

The following woodcut, half size, giving both front and side views, explains the instrument.

This dilator is simpler in its mechanism, more easily cleaned,



and cheaper than the former. It secures an absolute *parallelism* of dilatation from out to out, of  $\frac{3}{4}$  in., and possesses all the advantages of the screw attachment.

Yours very truly,  
C. D. PALMER, M.D.

## TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

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REPORTED BY PAUL F. MUNDE, M.D., SECRETARY.

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STATED MEETING, MAY 19, 1874. THE PRESIDENT, DR. PEASLEE, IN  
THE CHAIR.

### CASE OF HYDATIDIFORM MOLE.

DR. MUNDE exhibited a specimen of hydatidiform mole, the history of which is as follows:—Mrs. G., 44 years of age, the mother of ten children, nine of whom are still living, had always enjoyed good health. About four months ago, she menstruated, then skipped the next menstrual period, and eight weeks ago was taken ill with violent vomiting and general malaise, which was soon followed by severe and continuous metrorrhagia. She was seen by three physicians, none of whom seemed sure of the diagnosis, one of them only saying (as Dr. Munde was informed after the termination of the case) that she was pregnant, and would probably miscarry, if the hemorrhage continued.

When Dr. Munde first saw her, May 7th, the woman had been flooding for six weeks, and had become exceedingly anemic. The uterus extended 2" above the umbilicus, was disproportionately broad, and boggy and doughy to the touch; occasionally it would contract and become hard. On careful palpation and auscultation no fetal parts, heart-sounds or uterine souffle could be detected, neither had the woman ever felt fetal motions. On internal examination, the external and internal orifices were found patulous and easily passable for two fingers, which could feel the membranes intact, but aided by careful and protracted conjoined or bimanual manipulation, could not discover the presence of a fœtus. Occasionally, however, soft, floating masses would come between the fingers, reminding one of the coils of the umbilical cord in procidentia of that organ before the rupture of the membranes; there was no pulsation, however, and the undoubted absence of a fœtus corresponding in age to the size of the uterus, excluded the idea of the death of the child, and the consequent want of pulsation in the supposed umbilical cord. After a thorough and prolonged examination, and carefully weighing all these points, Dr. Munde came to the definite conclusion that the woman was certainly pregnant, probably, in reality, about four months, that it was no normal

pregnancy, however, but a false or molar pregnancy, in all probability of the hydatidiform class, and that there was no foetus, unless in a diminutive and externally unrecognizable shape, present. The patient and her husband were informed of this diagnosis, and also of the necessity of evacuating the uterus as soon as possible of its contents, in order to suppress the hemorrhage. The principal points on which the diagnosis was based were: the doughy, boggy feeling of the uterus, its breadth and length, entirely out of proportion to the probable duration of the gestation (four months), the absence of all physical signs of the presence of a foetus, and last, but not least, the soft, movable masses felt by the examining fingers in the uninjured membranes.

As it was already late in the evening, a cotton tampon was introduced merely for the purpose of checking the further flow of blood, and a mixture of tinct. cinchonæ cō., tr. ferri malatis and extr. fl. ergotæ, equal parts, dose 30 drops, given *ut aliquid fiat*; of this only one dose was taken. Active measures were deferred to the next day. During the night, however, violent uterine contractions set in and expelled a large quantity of vesicles, unfortunately in detached portions, mingled with coagula and shreds of membrane and placental tissue, besides an undeterminable amount of sanious fluid, thus verifying the diagnosis of the previous day. On examination the uterus was found to have diminished to less than half its previous size; in the cervix a soft mass could be felt proceeding from a larger mass still in the cavity of the uterus. In order to produce uterine contractions and cause the expulsion of the remainder of the mole, repeated attempts to extract which by means of straight and curved long forceps had proved unsuccessful owing to the constriction of the cervical canal, a colpeurynter was introduced and filled with ice-water, and ice applied to the abdomen; during that and the next day, one and a half ounces of Squibbs' fluid extract of ergot were given, and the colpeurynter frequently emptied and refilled, without, however, producing any contractions or materially dilating the os. After a futile attempt to introduce Barnes's dilator, a large elastic catheter was passed in, and about half a pint of ice-water injected through it into the uterine cavity, and the catheter left in place for twenty-four hours, when it slipped out, and, no contraction having as yet set in, was reintroduced and ice-water again injected. When, after the lapse of several hours, still no contractions ensued, the negative pole of a Faradic battery, armed with a sponge, was applied to the cervix, and the positive pole to the fundus uteri, and the strongest possible current of Kidder's battery passed through the uterus for half

an hour; the catheter was then reintroduced, the ice-water injected, and  $\frac{5}{8}$  ss. fl. extr. ergot given in three doses, one every hour. This treatment at last produced uterine contractions, and brought about the expulsion of the remaining fragment of the mole.

*May 10th.*—Bimanual exploration only could detect the fundus uteri; the finger passed into its cavity could feel a number of irregular excrescences of the size of a bean or pea attached to the left side, which were removed with the curette, in order to preclude any subsequent hemorrhage. Injections of carbolized water were ordered, tonics and stimulants given, and, at the date of the meeting, the patient was doing well and slowly recovering her strength.

The specimen as presented to the Society consisted of a large number of pediculated vesicles of the size of currants, attached to each other by short stems; unfortunately they had been expelled at different intervals, and in detached portions, and having become still more separated since their preservation in alcohol, presented by no means the regular, characteristic grape-bunch appearance of well-preserved specimens of this malformation. The weight and dimensions of the mole were not ascertained on account of this mutilation, but its original size can easily be computed by ascertaining the size of a uterus at the seventh month of pregnancy. As expelled, the fragments together represented a mass of about the size of two fists.

Cases of complete hydatid degeneration of the ovum are comparatively rare, whilst minute, almost microscopic, vesicles scattered here and there throughout the placenta are not uncommon. A feature of interest in this case and one frequently occurring in this disease, is the persistent atony of the uterus, which was doubtless caused by its excessive and disproportionate distention, and the still undeveloped state of the uterine muscular fibres at the fourth month of pregnancy.

DR. POOLEY said that he had only seen one similar case, in Yonkers, in which the hydatids were much larger and were expelled entire without treatment.

DR. PERRY said that the only case presented to the Society had been reported by the late Dr. Henschel several years ago; the hydatids were expelled at an early stage, pregnancy went on, and a normal child (it being a twin-pregnancy) was born at term.

DR. PEASLEE said that he had seen four cases in all, in which the diagnosis was not made until small portions of the mole had been discharged, and the bulk of the growth came away without active interference. He thought, that in the case of twins the degenerated ovum would be more readily expelled because the uterus continues to grow in size and strength with the living fetus.

## A NEW INTRAUTERINE SCARIFICATOR.

DR. PEASLEE exhibited an intrauterine scarificator devised by himself, and frequently used with very good results in congestion of the endometrium. It is of silver, of the size of a No. 8 catheter, slightly bent near the end, on the concave surface of which a small knife-blade is made to project and recede by means of a spring in the handle. It is an advantage to have the knife only on one side, because the amount and exact locality of the scarification can be better determined than when there are several blades. By merely turning the concavity of this instrument in various directions, more general scarification, if necessary, can be employed. The amount of blood drawn will depend, in a great measure, on the degree of tumefaction of the uterine mucous membrane.

## REFLEX HEMIPLEGIA AND PARALYSIS OF THE BLADDER FROM CONGENITAL PHYMOSIS IN CHILDREN.

DR. OTIS mentioned the case of a boy eight months of age, who suffered from retention of urine. The prepuce was found to be drawn to a fine point, and the opening in it so small as to admit only a fine silver probe. Dr. Otis slit up the prepuce as far as the corona glandis, and went to his office for a fine catheter; when he returned he found that the bladder had already been emptied voluntarily. He considers this case to be in a measure analogous to the three cases reported by Dr. Sayre, in which there was reflex hemiplegia and paralysis of the bladder apparently dependent on phymosis, and cured by the operative removal of this malformation, and the consequent relief of tension of the bladder caused by it.

DR. PERRY remarked, that one of the cases reported by Dr. Sayre had previously been under his care, and that there was then paralysis of the lower extremities, but none of the bladder, which came on only after Dr. Sayre took charge of the case. The mother had had syphilis in a severe form before the birth of this child, and had subsequently miscarried. After the division of the prepuce by Dr. Sayre the child improved greatly, but, as Dr. Perry heard, is still suffering from some debility of the lower limbs, for which it is treated by electricity.

DR. PERRY, DR. REYNOLDS, and DR. PEASLEE expressed their doubts whether there is any direct connection between the phymosis and the hemiplegia, since the phymosis hardly seems a sufficient cause, and is, besides, so common among young children that hemiplegia of the kind described in this connection would be much more common instead of being, as it is, the rare exception.

STATED MEETING JUNE 2D, 1874. THE PRESIDENT, DR. PEASLEE, IN THE CHAIR.

DR. BYRNE read a paper entitled

RESEARCHES IN GALVANISM: <sup>1</sup>

After referring to the various forms of single-fluid batteries from time to time devised, and pointing out the more prominent features and imperfections of each, he proceeded to detail some facts of great practical interest in the physics of galvanism.

Experiments undertaken some years ago, and still pursued, with a view to contrive some combination of elements by which great thermal power might be obtained in a comparatively small compass, have been referred to elsewhere.<sup>2</sup>

I have already demonstrated beyond question that, so far as a carbon-zinc rheometer is concerned, a galvanic power far exceeding all ordinary calculation may be procured by the combination of a large number of *small* elements in each cell, instead of a single pair, or indeed *proportionally*, any number of larger-sized plates; and secondly, that batteries arranged and constructed in accordance with principles thus suggested, possess, in addition to other important characteristics that of more continuous action.

The immersion of several plates in one cell without regard to their size, shape, or metallic connections, is, I need hardly say, by no means a novel proceeding, and the union of two or more negative electrodes, and as many or more zinc plates similarly joined, is an arrangement often resorted to in the construction of one-fluid plunge batteries.

The sole object in view in such cases has been to double, treble, or quadruple, as the case may be, the *quantity* of electricity to be set in motion. Such a combination is, in fact, believed or supposed to be but another way of uniting a number of cells in multiple arc, the gain being in quantity merely, but the electro-motive power of each compound cell remaining the same, and no greater than that obtained from any single cell in the series. So far as regards the joining together the same elements of two or more distinct cells in any fixed combination, as ordinarily used, this is doubtless true; but in cells of multiple elements of small size, say  $1\frac{1}{4} \times 5$  inches, such as *I employ and have been the first to suggest*, there is not only a remarkable *relative* increase in the volume of electricity ob-

<sup>1</sup> A brief synopsis only is here given, as the author, in compliance with the wish of the Society, has consented to have his views in detail published hereafter.

<sup>2</sup> See Clinical Notes on Electro-cautery.

tained, but also an appreciable addition to the electro-motive force of each cell. However paradoxical this latter assertion may seem to advanced physicists, it is nevertheless true, and may be verified by careful galvanometrical tests.<sup>1</sup>

The main object desired, however, has been, *first*, to find out some means by which the largest possible amount of all the electric power generated by a carbon-zinc combination in any single electrolyte, might be conducted through and out of the negative element, and thereby utilized in the thermal demands of electro-surgery; *secondly*, to contrive some method of arrangement whereby a more steady and continuous action might be obtained than has heretofore been possible from any simple one-fluid battery; and *thirdly*, to compress within a small compass such an apparatus as would possess these indispensable qualities.

Such are the characteristic properties of the little two-cell battery first exhibited to this Society over twelve months ago, and constantly used by me for every important cautery operation in hospital as well as private practice.

Among the conditions and agencies which unite in the accomplishment of the above objects, may be mentioned:

*First.* The entire end of each piece of carbon above the line of immersion, and to the extent of half an inch from its top, is furnished with a copper clamp, so that the current at all points, in its upward course, through and out of a body of great resistance, here finds a ready escape through one which, from its relatively large size, no less than its well-known specific conductivity, offers none.

*Second.* A single carbon piece thus fashioned, if placed in close relationship with its associate zinc, the interspace being one-eighth of an inch or less, the resistance offered by so thin a stratum of liquid in the case of each or any such pair will be comparatively little, while that of the whole cell organization must necessarily be as many times less as there are surface pairs in the compound arrangement.

*Third.* The limited width of the plates insures a free circulation in the cell, and provides a ready means of escape on all sides for wasted fluid and the damaging products of chemical action, thus influencing in a marked degree the tendency to molecular polarity, and, as a consequence, augmenting the

<sup>1</sup> Gen. H. L. Abbot, U. S. A., who has very thoroughly tested the power of most combinations ordinarily used, as compared with that suggested by me, in referring to his tables of Ohms, Volts, and Vebers, says, "The figures show that the new form is a decided improvement, and that the gain arises partly from less internal resistance, and partly from a *higher electro-motive*, the latter due no doubt to the mechanical circulation of the currents being favored by the numerous openings."



electric force and rendering the same more steady and continuous. Finally, the convergence and union of what I am disposed to consider in some degree so many distinct electric forces in one main conductor, may possibly serve to intensify the whole aggregate current.

Whatever weight, if any, may be attached to this latter hypothesis, the one great aim in the whole arrangement has been to lessen the cell resistance, and the result has been eminently satisfactory thus far. It might be well, however, to remark that the gain observed is probably due, not so much to any one of the above conditions as to their combined influence.

For example, a carbon plate of ordinary thickness,—say one-quarter of an inch, ten inches wide by five inches deep, provided with a stout copper clamp running its whole width, and having eight upright brass stems, one inch and a quarter apart, by which to bolt it to a horizontal main conductor on the upper surface of an insulating platform, would be about equal to the conjoined negative elements and their metallic connections in one of my cells.

One such negative suspended between two amalgamated zinc plates of equal dimensions, the interspace being one-eighth of an inch, would constitute a galvanic pair whose intra-cellular resistance, according to a fixed law in electro-physics, must be the same, or very nearly so, as that of the cell composed of multiple small elements.

Yet if we test the relative heating power of both organizations immersed to the same depth in strong bichromate solution, what do we find? On closing the circuit the first impulse of the current will be observed to be nearly equal in both, and about three inches of looping wire may be rendered incandescent by each cell. This similarity of action, however, will be found to be of but momentary duration, for while the wire introduced in the circuit of the cell composed of small elements, will continue at a white heat, or with but little falling off for fifteen minutes, and will not lose more than one-third, or at most one-half in twenty-five minutes, that connected with the cell of large plates will cool so rapidly that within five minutes all evidence of heat in the wire, so far as regards its color, will have disappeared.

This remarkable contrast will be even more striking if a suitable galvanometer (tangent) be employed in the experiment.

The explanation is simply this: in the one case there are spaces for a free circulation, and a continuous interchange between the several layers of decomposing material and an outlying body of fluid, more or less unimpaired because less directly under the influence of electro-chemical action. In the other,

there is a speedy "dropping down," because the broad and thin stratum of fluid between the plates, though at first a good conducting medium, soon becomes exhausted, and having no easy means of escape, the resistance here offered to the current momentarily increases, counter-currents are set up, and the whole condition now brought about is that known and described, whether correctly or otherwise need not be here discussed, as polarization of the negative plate.

From the foregoing remarks it will be seen that the causes which have heretofore largely contributed towards rendering the use of single fluid-batteries more or less unsatisfactory, have been twofold. First, the omission to provide for a free circulation in the liquid, and thus insure more steady and continuous action, and secondly, the setting in motion a great amount of electric force, and its distribution over a large area of negative material, whose resistance is probably four hundred times greater than that of copper. In other words, by uniting a mere wire, or one or two small metallic conductors to a large carbon plate, instead of the reverse, as it ought to be, we fail to provide an avenue of escape in any degree proportionate to the volume of electricity generated.

Having thus indicated a means whereby the intracellular resistance of a carbon-zinc combination may be greatly reduced, I would now call attention to a certain defect in all such batteries, and one for which I believe no remedy is possible so long as carbon continues to form the negative element. I refer to the intense heat generated within the cells after protracted immersion with closed circuit, in consequence of which a rapid and useless waste of zinc takes place, and the metallic connections suffer in conductivity by reason of their becoming overheated. Some idea of the evil effects and extent of this heating may be formed when I state that the temperature of the fluid in my battery after forty-five minutes' steady immersion, reaches  $145^{\circ}$ . To account for this serious drawback, and to give any satisfactory or rational explanation of its occurrence, has, up to very recently, been found a very difficult matter; but after many experiments, and a full consideration of various theories from time to time suggested, the following may, I think, be accepted as the correct one.

Though zinc, if well amalgamated, may be said to be almost inactive when immersed in dilute sulphuric acid, so long as the circuit is open; yet, when bichromate of potassa is combined with this same fluid, quite another state of things will be observed: this positive metal, however well protected, being no longer passive, but powerfully acted upon by the stronger compound. For example: 10 square inches of such zinc surface,

if immersed for forty-five minutes in 20 cubic inches of strong bichromate solution will raise the temperature of the latter  $40^{\circ}$  F., *independently of any galvanic action*. If, then, we consider  $65^{\circ}$  as the ordinary temperature of the solution used, and  $145^{\circ}$  as its maximum, after forty-five minutes, continuous galvanic action, the whole increase will be  $80^{\circ}$ , of which but one-half is due to the simple chemical action of the liquid on the zinc, so that we have still  $40^{\circ}$  to account for. Of this latter I would estimate about one-quarter as being due to the increased effect of the fluid on the positive metal when the circuit is closed, and the balance, *three-eighths of the whole increase, to the resistance encountered by the current at the negative plate*. In other words, there are two main sources to which we are to look for an explanation of this excessive heat—the one, electrochemical action, and unavoidable, and to which over one-half of the whole increase is to be attributed; the other, resistance at the negative plate, by which a difference of potential is established between two points in the current, the liquid electrolyte and the outside metallic junctions.

So far as regards surgical requirements, the elevation of temperature within certain reasonable limits does not seem to materially impair the conductivity of metallic connections, while it may and probably does tend to lessen the resistance of the fluid. Nevertheless, when such increase exceeds  $40^{\circ}$  or  $50^{\circ}$ , rapid disintegration of the elements of the liquid on the one hand, and such excessive heat on the other, must be attended by great and useless waste of energy, and a corresponding loss of outside thermal power is inevitable.<sup>1</sup> Under such circumstances, though a vast amount of electricity may be generated, but a very small proportion is conducted out of the cell.

For the purpose, therefore, of ascertaining how much of the difficulty complained of might reasonably be attributable to the well-known resistance of carbon as a negative, and with the hope of obtaining some substitute of better conducting qualities, many experiments with the following metallic substances in combination with zinc have been resorted to, viz.: 1, platinized silver; 2, plates of solid platina, plain and platinized; 3, copper, first protected by a thin film of tin and lead, and then platinized in the ordinary manner; 4, the same metal also first protected, in one case as before, again by electro-gilding, and, finally, covered with a bright electro-deposit of platina; 5, chromated lead; 6, copper covered with the latter; 7, alumin-

<sup>1</sup> The resistance due to overheating of the metallic connections may be estimated at one per cent. for every  $5^{\circ}$  above  $65^{\circ}$  or  $70^{\circ}$ .

ium platinized; 8 copper hand-plated with platinum foil, and the edges protected by an insulating material.<sup>1</sup>

Omitting, for the present, a detailed account of the many interesting phenomena observed in these researches, I shall merely submit a brief statement of what took place when platinized silver was substituted for carbon in my little battery of two compound cells.

Nine inches of platina wire, in size No. 21, B. G., were immediately heated to whiteness. At the expiration of half an hour, the rise in temperature of the liquid was comparatively little, in fact, less than would have taken place after fifteen minutes' continuous action with carbon as a negative; while the heat in the wire for its whole length kept up steadily, and was to all appearance undiminished. After forty-five minutes the wire showed some signs of cooling for the extent of about one inch only from either pole,—but the heat in the cells was now about equal to that noticed with the carbon-zinc combination after twenty or twenty-five minutes' action.<sup>2</sup> At the expiration of one hour the glass cells and metallic connections became intensely hot, and the wire presented a dull red color in its middle third only. The battery was now moved up and down rapidly in the fluid a few times, and then fully immersed as before, when the wire immediately regained its lost heat, to a degree, if not equal, at least nearly so, to that noticed at the beginning.

The heat thus restored was, however, of short duration, and rapidly disappeared altogether, the fluid consisting of one pint only in each cell, being now nearly exhausted. Nevertheless, when the fluid was agitated again and again, a fresh, though momentary glow of heat was produced in the wire, while more or less continuous incandescence seemed possible for a much longer time by constant agitation. When the battery was washed, and the plates examined, it was found that the platinum deposit had been almost entirely thrown off, and the silver surface thus exposed, having been violently acted upon, had lost considerable in weight. A large quantity of yellowish precipitate was found in each cell—probably a chromate of silver.

Numerous subsequent experiments, modified in accordance with the lessons taught by this first trial, would seem to warrant the following conclusions, *first*, that the heating power of any

<sup>1</sup> For valuable aid in conducting these experiments I am much indebted to Mr. Frederick E. Beardslee, of Brooklyn.

<sup>2</sup> The cause of the great heat at this time was correctly surmised to be owing to the removal of the platinum deposit from the silver and chemical actions on the latter.

battery will be found to be in direct proportion to the volume of electricity conducted out of the cells; *second*, that so far as a carbon-zinc combination is concerned, a very considerable proportion of the whole electric force generated never finds its way out of the cell, because of the unequal conductivity of the negative and positive electrodes; *third*, that resistance to the current at any point in its course, whether within the cell or outside, generates an amount of heat proportional to the expenditure of energy thus perverted in forcing its passage through a resisting body; *fourth*, that the removal of any definite amount of cell obstruction must necessarily be followed by a corresponding gain in outside thermal power; and *finally*, that by the employment of silver, copper, aluminium, or other good conducting metallic negative, first protected by a thin film of lead, and subsequently platinized or chromated, according to the process of Mr. Geo. W. Beardslee, or solid platinum, if sufficiently thick, roughened and platinized, an almost incredible amount of thermal power and great constancy of action may be obtained within a very small compass.<sup>1</sup>

#### CASE OF UTERINE FIBROID WITH HYDROMETRA.

DR. PEASLEE exhibited a specimen taken from a lady 53 years of age, who had ceased menstruating three years ago, and had been seized with violent metrorrhagia some two months ago. He first saw her in consultation with Dr. F. N. Otis, six weeks ago; three days before she had a copious discharge of clear fluid from the vagina, which undoubtedly came from the uterine cavity. There was a large abdominal tumor, which on the right side extended 2" above the umbilicus, and on the left side, 2" below that point; the tumor on the left side was softer and apparently fluctuating, and seemed distinct from the main tumor. The whole mass was very movable, and easily rotatable on its axis. The os uteri was situated very far forward behind the os pubis, and it was only after some difficulty that the sound could be introduced and passed up 3", and by no manner of rotation and manipulation could it be made to pass up higher. The tumor seemed to have collapsed somewhat

<sup>1</sup> It is hardly necessary to remark that for silver and aluminium, a protecting coat of lead is only needed when bichromate solution is used. So far as the latter metal is concerned, when properly platinized it might serve as a good substitute for the ordinary Smee element in dilute sulphuric acid.

The fact that the above "Researches" were made almost solely in the interest of uterine surgery, for which class of operations Dr. B. wholly uses his battery, explains the introduction of this, otherwise foreign, topic into these Transactions.—SEC. and ED.

after the above-mentioned watery discharge. The presumptive diagnosis of a uterine fibroid on the right and an ovarian tumor on the left side was made, and non-interference advised. Two weeks later Dr. Peaslee saw the patient again, the discharge had become offensive, but was still clear; symptoms of septic absorption were manifest, such as slight stupor. Injections of Labarraque's solution were made into the uterus and vagina with most excellent results; the quantity of fluid diminished, the cyst collapsed, and was no longer palpable, and the general condition of the lady improved wonderfully. A week before her death another severe metrorrhagia came on, by which she lost fully one quart of blood; it was arrested by plugging the os uteri and vagina. She rallied slightly, but gradually sank and died from exhaustion and septic infection. Three days before her death the discharge became brownish and very offensive.

The specimen, as presented, consists of a large uterine fibroid, which forms the bulk of the tumor, and the enlarged and elongated uterine cavity, which formed the supposed ovarian cyst on the left side, and the capacity of which was about 3 quarts. Could the sound have been passed into this cavity, it would have entered to the depth of eight inches. Undoubtedly at some period during the last three years since the climacteric the os uteri became closed and a large accumulation of fluid took place in the uterine cavity. The tumor is, therefore, a uterine fibroid complicated with hydrometra. A portion of the lining membrane of the cavity of the uterus was discolored and putrid, probably the spot whence the profuse and fatal hemorrhage came.

Dr. BYRNE related a case, which he had seen several years ago, in which there appeared to be an ovarian tumor. The patient was seen by several gentlemen, who all concurred in the diagnosis. The sound passed into the uterus to the ordinary depth. Ovariectomy was undertaken, and when the tumor was reached it was found to be a fibro-cystic elongation of the uterus, the only pedicle being about 3" of the lower portion of the uterus and the upper portion of the vagina. The sound could be passed up 11" through the continuation of the fundus.

Dr. PEASLEE had seen one case of fibro-cyst of the uterus attached to the fundus merely by a small pedicle about one inch in length; the tumor was almost entirely adherent in its periphery, and was, therefore, removed with great difficulty, the pedicle was merely ligated and divided like any ovarian-cyst pedicle. The tumor weighed 40 lbs. The patient recovered. He had seen one more case of fibro-cystic tumor of the uterus,

which was also mistaken for an ovarian cyst; ovariectomy was attempted, but abandoned when the nature of the tumor was discovered, and the patient died from shock.

Dr. KAMMERER reported a case in which there was a large tumor in the right side of the abdomen; the sound could be introduced but little higher than the normal depth. Ovariectomy was attempted, and the tumor found to be a uterine fibromyoma. The operation was abandoned, and the woman died. At the autopsy it was found that the cavity had made a sharp turn at about 3" from the external os, and that it extended up still 3" higher. If this could have been ascertained by the sound before, a useless and dangerous operation would have been avoided.

Dr. PEASLEE suggested that in cases where one would expect the sound to go in higher than the normal depth, and it is found to enter only  $2\frac{1}{2}$  to 3 inches, repeated trials should be made to discover the prolongation of the uterine cavity, if there be one, and a flexible catheter should be passed in, in various directions; if this goes in farther than the stiff sound, a wire stylet should be passed through it, to see that it has not become bent and curled, and thus simulated an elongation of the uterine cavity.

#### THREE NEW UTERINE DILATORS.

Dr. MUNDE exhibited the uterine dilator devised and used by Dr. Ellinger, of Stuttgart (described in the *Archiv für Gynäkologie*, V. 2, 1873), which he had brought from Stuttgart himself, and, influenced by the personal recommendation of the inventor, had used in a number of cases, repeatedly, in at least 30 patients before and since the publication of Dr. Ellinger's article. The cases in which Dr. Munde has used it were principally antelexions, a few retroflexions, simple constriction of the cervical canal without dysmenorrhœa, endometritis with profuse catarrhal secretion, and in two cases of miscarriage, to dilate the cervical canal and internal os sufficiently to permit the introduction of the finger and curette and removal of adherent shreds of placental tissue. The constant and annoying pain in the back and limbs in antelexion, the feeling of weight and bearing down in endometritis were almost invariably temporarily relieved by moderate dilatation. The dilator was also found very useful for the purpose of dilating the cervical canal and uterine orifices, to prevent the fluid from being in a great measure rubbed off by the cervical walls from the cotton-wrapped applicator, while it was being passed into the uterine cavity, for the purpose of intrauterine medication. In two

cases, both severe antelexions, in which permanent dilatation was necessary, the dilator greatly facilitated the introduction of the sponge-tent and laminaria by temporarily removing the angle of flexion and dilating the canal of the cervix. The instrument is as easy of introduction as the sound, and the dilatation, if performed slowly, causes no pain except a slight feeling of tension, and is followed by no bad results whatever. Objections to this dilator are the weakness of its blades, which causes it to feather at the point, the necessity of exercising constant pressure on the handles, if a continued dilatation for a few minutes is desired, and the unsteady, irregular manner of the dilatation, which is performed merely by manual compression of the handles, like a pair of scissors. These disadvantages, the two former of which could easily be removed by strengthening the blades and adding a screw to the crossbar with linear marks on the handles, have been noticed by Dr. C. D. Palmer, of Cincinnati, in an article in the *Clinic* of May 16th, 1874,<sup>1</sup> in which he describes an instrument of his invention, which certainly is superior to Dr. Ellinger's, in that it consists of a single tube, the dilating blades being worked by a screw in the handle. The blades, however, diverge at their points, thus dilating the internal os more than the external, although Dr. Palmer claims that this is obviated by the slight feathering of the blades. The best dilator which has come to Dr. Munde's notice was shown him a few days ago by Mr. Philip Schmidt, late of Tiemann & Co., now corner 34th Street and 6th Avenue; it was devised by Dr. Charles Miller, of this city, and has not been described as yet.<sup>2</sup> It consists of a wide tube, also with the dilating screw at the end of the handle, the blades are tolerably strong and do not feather, and are arranged so as to separate equally in their whole length, thus producing an entirely equal dilatation of the external and internal os and the cervical canal. Its utility would be fully as extended as that of Dr. Ellinger's instrument.

Dr. BYRNE has used Peaslee's steel dilating sound with great satisfaction; it is surprising to see what benefit is derived in some cases from the rapid dilatation of the cervical canal by the introduction of progressive sizes during the short space of fifteen minutes. After dilatation with these sounds he occasionally introduces a long forceps and dilates still more with facility and safety. He also uses Molesworth's dilator, but thinks it is of no use whatever in the cases in which steel dilators are used, that is, in vaginal and narrow cervical canals. Where Barnes's dilators have hitherto been largely used, when the os and cervix

<sup>1</sup> See August number of this Journal, page 311.

<sup>2</sup> Since described page 295, August number of this Journal.



are already more or less dilated and softened, Molesworth's instrument is very useful and superior to Barnes's.

Dr. SIZER agreed with Dr. Byrne as to the utility of Molesworth's dilator, and always uses it instead of Barnes's, because it is easier of introduction, and does not slip in or out when distended, which Barnes's is very likely to do.

Dr. KAMMERER said that Molesworth's contrivance is longer than the uterine cavity (Dr. Byrne said that this objection could be removed by winding a strip of muslin around the portion which is not intended to be dilated), and also acts like the laminaria in being constricted at the point of stricture, at least the smaller sizes. Dr. Ellinger's instrument is no novelty, being constructed on an old principle, and is besides too weak for some cases of indurated cervix, as it is not unfrequently met with in areolar hyperplasia. He thinks that in these cases the steel sounds devised by Dr. Peaslee and himself would be much more serviceable.

Dr. BYRNE asked for the principle on which dilatation by sponge-tents takes place; it cannot be the expansion alone, for that would appear to be but slight, but must be owing to the softening and relaxation of the tissue, and perhaps the temporary paralysis of the muscular fibres of the cervix. In this respect, he thinks sponge-tents differ from laminaria, which dilates by absorption of fluid and actual expansion of its bulk.

Dr. PEASLEE thought the action was the same for both, absorption of fluid from the tissues and consequent swelling of the highly compressed agent, particularly the sponge-tent, which is compressed more tightly and absorbs fluid more freely than the laminaria, and the expansion of which is therefore greater and more thorough. He instanced the splitting of a rock by the growth of a tree in a crevice or fissure, as a proof of the great force exerted by the swelling of even a softer substance than the one in which it is enclosed, and which it finally rends asunder.

NOTE.—Under date of Oct. 4th, Dr. Ellinger informs us that he had formerly doubted the possibility of permanently replacing a retroflexed uterus, which operation he was in the habit of performing at his office, only to find the old displacement a few days later. He has now, for some time, adopted the plan of replacing the retroflexed organ with his dilator at the house of the patient, keeping her in bed for three to eight days thereafter. A slight degree of parametritis is set up by the reposition and dilatation, and "the uterus is, so to speak, walled in in its new position." After quitting the bed, the uterus is supported by a Hodge pessary for six to eight weeks. He claims to have very good results from this treatment.—ED.

## TRANSACTIONS OF THE PHILADELPHIA OBSTETRICAL SOCIETY.

REPORTED BY J. V. INGHAM, M.D., SECRETARY.

STATED MEETING, FEB. 5, 1874. DR. ALBERT H. SMITH, NEWLY ELECTED PRESIDENT, IN THE CHAIR.

THE PRESIDENT delivered an introductory address.

### FATAL CASE OF PUERPERAL METRITIS.

DR. PACKARD exhibited the uterus and ovaries removed from a patient who died on the eighteenth day after delivery. The history of the case he gave as follows:

Mrs. K., æt. 44, was delivered of her ninth child, a girl, Jan. 8, 1874. The doctor had attended her on four previous occasions. Her labor was not a very severe one. The umbilical cord was not perfectly natural, having a sort of blood-stained portion (like cellular tissue, with serum deeply stained with blood infiltrated through its meshes), extending along it from the navel.

Mrs. K. did well until the fifth day, when her mind began to wander, and for a day or two she had decided puerperal mania, with much prostration, some hypogastric tenderness, and diminution of lochial discharge. Lactation was also deficient. Under nutrition, stimulants, quinine, tincture of iron, and local remedies, she improved very much, and seemed to be rapidly returning to her usual health. But on Jan. 26th, the eighteenth day from her confinement, having been out of bed for short periods for several days, she got up and was dressed. She felt so well that she undertook to walk about her room, having dined heartily an hour or two before. She was suddenly attacked with epigastric pain, and became collapsed. Only partial reaction took place from the use of sinapisms and stimulants, and she died about two hours after the pain came on.

*Autopsy*, made twenty-four hours after death, Dr. Winthrop Sargent assisting him. Body on ice; rigor mortis well pronounced.

*Thorax*.—Lungs healthy, but traces of slight tuberculous deposits at both apices. No pleuritic adhesions except above. Heart decidedly fatty; it contained fluid blood, as did also all the vessels except the iliac and ovarian veins on the left side, where there was a clot about five inches long.

*Abdomen*.—Liver quite large and fatty. Gall-bladder distended with fluid bile; no gall-stones. Stomach much distended

with entirely undigested food. Spleen, pancreas, and kidneys normal. Uterus about the size of a large butter pear. Fallopian tubes swollen and deeply congested. Ovaries white and hard, of normal size. On laying open the uterus, its tissue was soft, its lining membrane congested and velvety, its contents a thick, grumous, bloody liquid, almost black in color.

Under the microscope the muscular fibres of the heart were seen to be fatty in a marked degree.

It seemed as if death had been caused by oppression of the nerve-centres by the distention of the stomach, or by the failure of the heart's power when she over-exerted herself in walking about her room, or more probably by a combination of these conditions.

#### CALCAREOUS TUMOR OF THE BROAD LIGAMENT.

Dr. INGHAM exhibited a small fibroid tumor of the broad ligament, that had evidently undergone calcareous degeneration. There was no clinical history connected with the case, as he had found the specimen in the post-mortem room of the Philadelphia hospital. The patient had died during an attack of acute pneumonia.

The tumor was over an inch in diameter, and had in its centre become firmly calcified. He thought that the specimen was interesting, as he believed that these tumors are rarely found in the broad ligament.

Dr. H. LENOX HODGE remarked that the specimen was rare and interesting. He had never seen a similar specimen. In this opinion other members concurred.

#### DONATIONS TO THE MUSEUM.

Dr. INGHAM presented to the museum a pair of Sir James Y. Simpson's obstetric forceps, made by Young, of Edinburgh.

Dr. W. F. JENKS presented to the museum a valuable donation from Mr. Gemrig, consisting of thirteen pairs of obstetric forceps.

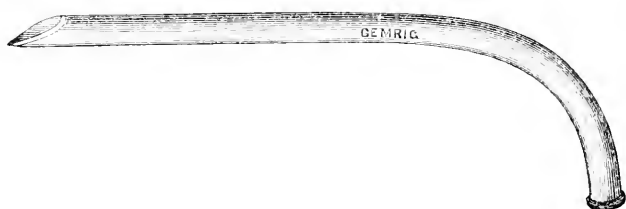
STATED MEETING, MARCH 5, 1874. DR. ALBERT H. SMITH, PRESIDENT,  
IN THE CHAIR.

#### NEW FORM OF OVIOTOMY TROCAR.

Dr. H. LENOX HODGE exhibited a *canula for tapping ovarian cysts*, and remarked that the two great improvements that have of late years been made in the operation of tapping consist in using an instrument which shall act as a syphon, and one which will allow the fluid to flow the moment that the puncture is

made. The syphon-action allows the patient to be tapped while lying on her back, renders unnecessary the use of compressing bandages, prevents the entrance of air into the cavity of the cyst, and allows the fluid to be withdrawn without wetting the patient. An instrument which allows the fluid to flow the moment that the cyst is punctured removes the pressure instantly, and thus prevents the cyst from splitting at the point of puncture. Mr. Spencer Wells's canula accomplishes these ends, but is complicated and expensive. The india-rubber tube attached to it must bend on itself more or less abruptly, and thus the calibre of its tube is interfered with, and the current of the fluid interrupted. The hooks to clasp the cyst are unnecessary, and the canula is too short in cases of multilocular cysts.

The annexed woodcut represents a most simple and yet extremely efficient canula.



It is made of steel, nickel-plated, and should be 10 inches long, and for thick fluids should be half-inch in diameter. One extremity slopes obliquely to a point, which should be sharp enough, with moderate pressure, to penetrate the cyst readily after the skin has been divided by a knife, and yet not so sharp as to wound any structure that might come in contact with it without pressure. The other extremity is curved, and has an elevated rim for attachment of the india-rubber tube. The india-rubber tube thus will hang without bending, and the fluid will pass freely without interruption. This curved extremity also serves as a good handle.

Dr. HODGE stated that he used this canula in the simple tapping of ovarian cysts and in operations of ovariectomy, and had found that its efficiency fully equals its simplicity. The puncture that it makes is semi-lunar in form and readily heals. The instrument maker should be careful to sharpen only the pointed lower half of the orifice. If this orifice were sharp around its whole circumference it might cut out a circular piece, as has often been done by Mr. Wells' instrument, when badly made.

DR. HARLOW suggested that, as in multilocular cysts, there may be fluids of various densities, it would be impossible to introduce a sound through the curved tube to clear away the thickened fluid.

DR. HODGE replied that the remedy for that was in the use of a flexible bougie. Practically, as soon as the fluid becomes so glutinous that it will not flow, the cannula must be taken out. There are some cysts the fluid of which will not flow through any tube.

#### MEMBRANOUS DYSMENORRHEA.

DR. J. L. LUDLOW exhibited a large piece of false membrane that had been cast from the uterus of one of his patients. Its passage through the cervical canal caused great suffering. Drs. Curtin, Betts, and Prall reported analogous cases.

STATED MEETING, APRIL 2, 1874. DR. ALBERT H. SMITH, PRESIDENT,  
IN THE CHAIR.

#### ELONGATION OF THE CERVIX UTERI.

DR. JENKS presented a specimen of elongation of the supravaginal portion of the cervix uteri. He remarked that the specimen was not a typical one, but was of interest in the study of the disease in its origin and incipency. The body of the uterus was large. The length of the uterine cavity was 3 inches, and the cervix  $2\frac{1}{2}$  inches. The tissues were hard. Microscopically, there was found no true tissue of the part. The muscular fibre had undergone degeneration, and the intermuscular tissue was increased. There was no prolapse of either anterior or posterior vaginal wall. The uterus was slightly anteflexed.

In regard to the question of descent of the uterus in these cases, Dr. Jenks remarked that in hypertrophy of the intravaginal portion of the cervix, there is no reason why descent of the fundus should take place. In hypertrophy of the supravaginal portion, the weight of the organ may bring it down.

DR. GOODELL remarked that there was much difference of opinion as to the origin of this elongation of the cervix. He was not exactly satisfied that this case was one of the disease as we know it. In all the cases he has seen, the mucous coat of the cervix was thickened and very soft. He had never seen the cervical tissues so hard and dense as in this specimen. In regard to the surgical treatment of the disease, if the fundus uteri is not low down, the simple excision of the cervix is sufficient. If the prolapse is very marked or complete, then, in addition to the ablation of the cervix, must the valvo-vaginal

opening be narrowed. He had never found a pessary that would permanently support the uterus in these cases until he tried Dr. Spooner's instrument, which had thus far proved successful in giving relief.

Dr. JENKS replied that he recognized the fact that there was a doubt as to the true nature of the specimen. The intravaginal portion was a specimen of hyperplastic growth. The case was one of hypertrophic enlargement of the supra-vaginal portion of the cervix.

Dr. A. H. SMITH gave his plan for the treatment of procidentia uteri. After replacing the uterus, he introduces a pessary, and then sustains the pessary in position by sponges, saturated with an astringent, such as the glycerole of tannin. By constantly renewing this support for a while an astringent effect on the tissues is produced, which is sufficient to relieve the difficulty.

#### LUMBAR COLOTOMY.

Dr. PACKARD gave a detailed account of a case of lumbar colotomy, the operation being performed for the relief of a patient suffering from the almost entire closure of the rectum by the pressure of a large cancer of the uterus. The operation was successful, the patient expressing great relief from her previous sufferings.

He reported the case as one that might be of service to the members of the society in assisting them in relieving some of the sufferings in these cases of large uterine cancer. He thought, further, that it would help to remove the general impression that such an operation leaves the patient in a condition worse than death.

STATED MEETING, MAY 7, 1874. DR. ALBERT H. SMITH, PRESIDENT, IN THE CHAIR.

Dr. W. H. PARRISH read the following history of a case of craniotomy. Rachitic pelvis, antero-posterior diameter  $1\frac{3}{8}$  inches. Death at beginning of fifth week, from pyæmic puerperal fever.

During the night of March 18th, 1874, I was called to a colored woman, then in labor, and on whom it was stated craniotomy was required. The woman, aged 28, was an out-patient of the Bedford Street Mission Hospital, and had been under the charge of a female physician. I found her in a rickety wooden building in Middle Alley. The house was occupied by a mongrel crowd of whites and negroes in various stages of drunkenness, and exhibiting all the evidences of abject poverty, wretch-

edness, and degradation. We were shown to the garret, a most dismal, forbidding den, so low that by persons of ordinary stature the erect posture could not be assumed. The leaky roof let in the wind and rain, and there was no fire or other means of counteracting the chilling effects of the weather. By the gloomy light of a smoky coal-oil lamp we saw our patient, a black dwarf, a fit denizen of the contracted apartments. With a couple of boxes for her bedstead, with a few straws, rags and old skirts for her bedding, and in the midst of filth and vermin, her surroundings could but seem to us not at all propitious for the performance of so serious and horrible an operation as craniotomy. Moreover, the woman was at full term, had been in labor for at least 36 or 40 hours; was restless, with a feeble pulse of 120 per minute, and with evident exhaustion. The external genitals were hot and exceedingly sensitive. The abdomen protruded markedly forward, and the uterus was deflected to the left. Her stupidity was such that no satisfactory history of herself could be given; she stating that on two previous occasions, two children had been taken from her, and that in neither was the head crushed.

We etherized her for examination. The examining finger came directly in contact with the sacral promontory. With the hand only, we took the antero-posterior of the superior strait to be not more than two inches, and its shortening to be due to the jutting forward of the promontory. There was evidently less relative diminution of the other diameters—especially of all the diameters of the inferior strait. The membranes were intact, but were then ruptured. The head, the presenting part, was in the left anterior position of the vertex, and above the pelvic brim.

The case evidently called for either craniotomy or the Cæsarean section, and the already much depressed state of the woman demanded an immediate operation. Her circumstances seemed to me to preclude the idea of Cæsarean section, and I at once decided on craniotomy.

Owing to a number of unexpected delays, the instruments for the operation did not arrive until  $1\frac{1}{2}$  hour after the rupture of the membranes. In the meantime, the woman—though aroused from the ether, and receiving morphia and whisky—was becoming more exhausted, so that before being again etherized for the operation, the pulse had risen to 130 per minute. The head, by external pressure, being steadied by Mr. Loder, I easily passed Harlow's perforator through the posterior fontanelle into the cranial cavity, and with it broke up the brain tissue. Then, with Meigs' embryuleia forceps, leaving the scalp when practicable, I tore off, piece by piece, the bones

of the vertex, to accomplish which required each time considerable tractive force. Gradually, yet steadily, the cranial vault was thus removed, each attempt however, taking away scarcely more than could be included in the bite of the forceps. Having reached the base I seized the chin with the blunt hook and endeavored to bring down the face and thus make the base pass through edgewise. This I could not accomplish. The hook would tear its way out. Again I resorted to the embryuleia forceps, and now removed portions of the cranial base itself. In the meantime the woman's condition was evidently becoming a critical one. Her pulse became even more frequent, feeble and flagging. The coldness of her surface showed a much depressed vitality, and the tediousness of the child's removal was so great that we feared the patient might die, undelivered even.

Eventually the remnant of the head was drawn into the pelvic excavation, but the shoulders would not engage. Every hold either with hook or forceps would tear out, until the base was, as it were, in shreds. Now, however, by securing a strong fillet around the neck, and by taking a twist in this with the hook of Wallace's forceps, I succeeded, after a number of minutes and the exercise of all the force at my command, in delivering the woman of a male child which in its entirety would have weighed eight pounds most probably. The placenta was removed by Credé's method without difficulty and without bleeding. The woman was now aroused, and morphia and whisky administered. She soon rallied, the pulse falling to 110. She then confessed to having undergone a similar experience on two previous occasions, at the Philadelphia Hospital, and we then recognized her as Josephine Scott. (See AMERICAN JOURNAL OF OBSTETRICS AND DISEASES OF WOMEN AND CHILDREN, February, 1873, p. 646.)

The membranes were ruptured about 40 hours after the beginning of labor, the head perforated  $1\frac{1}{2}$  hour after the rupture of the membranes, and the delivery effected two hours after the perforation of the head.

As the subsequent treatment, we directed the daily administration of quin. sulph. gr. xii., and morph. sulph. gr. ss., with nutritious and easily digested diet and the careful use of stimulants. It was easy to give directions but with none around her willing or fitted to perform the duties of nurse, it was impossible to have her merest wants attended to. She repeatedly passed her urine in bed because no one would hand her the needed vessel, and on the second night she partook of a hearty meal of fat pork.

*First and second days.*—Temperature 100° F. Pulse 110;



abdomen slightly tympanitic, but without pain save on pressure on the uterine body; urination normal.

*Third day.*—Anxious, tremulous. Pulse 125, feeble, irregular and fluttering. Skin hot and dry. Abdomen quite tympanitic; no increase of pain. Urination normal. Directed, in addition, tr. digitalis and castor-oil mixture.

*Fourth day.*—Had a "flooding of water," urine dribbling from her. Diagnosed vesico-vaginal fistula. Bowels moved; tympanitis less. Pulse improved.

*Sixth day.*—A very cold one. Woman in severe rigor, shaking the boxes beneath her. Evening temperature, 103° F.

On different days the rigors repeated themselves, the temperature ranging from 100° F. to 104° F. Diphtheritic ulcers appeared on vulva and along the vagina, though daily syringed with a solution of potassic permanganate. The left iliac region became painful on pressure, indurated, but fluctuating a few days prior to death. The uterus remained deflected to the left, as if held by old inflammatory changes.

It was impossible to secure the proper and regular administration of nourishment or medicine. Exhaustion increased, and death supervened on April 17th, a little more than four weeks from the day of delivery.

*Autopsy* 36 hours after death. Emaciation marked. In the left iliac region a distinct fluctuating tumor. No general peritonitis. Evidences of former, but none of recent perimetritis. Numerous fibrinous bands extended from the uterus especially across Douglas's *cul-de-sac*; found also tumor on the anterior surface. Marked thickening of left broad and round ligaments.

The left iliac region, beneath the peritoneum, filled with purulent fluid, amounting to probably a quart. Cellular tissue of that side, where not completely broken down, infiltrated with pus.

Same condition of cellular tissue around the vagina.

Distinct from the sub-peritoneal abscess, was another—a subperiosteal one. Between the two there was no discernible communication. The latter abscess existed beneath the periosteum, lining the posterior surface of the pubic bones. The inter-articular fibro-cartilage of the symphysis had entirely disappeared, its place being supplied by a gelatinous purulent fluid.

The pelvis is distinctly kidney-shaped at its brim. The sacral promontory jutting forward so as to be the essential cause of the deformity. The outlet is not greatly diminished, nor is it ordinarily so in a rachitic pelvis.

The measurements of a dried *ligamentous* preparation of the pelvis are:

<i>Superior Strait.</i>		<i>Inferior Strait.</i>	
Antero-posterior diameter...	$1\frac{1}{8}$ inches.	Antero-posterior diameter...	3 inches.
Transverse diameter.....	$4\frac{1}{2}$ "	Transverse diameter.....	$3\frac{3}{8}$ "
Oblique left posterior.....	$3\frac{3}{4}$ "	Oblique left posterior.....	$3\frac{1}{2}$ "
Oblique right posterior.....	4 "	Oblique right posterior.....	$3\frac{3}{4}$ "
Left oblique conjugate.....	2 "		
Right oblique conjugate....	2 "		

The difference in the oblique diameter of both the brim and the outlet is due to the right sacro-iliac synchondrosis being on a plane posterior to that of the left.

Depth of symphysis pubis, with triangular ligament.	$1\frac{3}{4}$ inches.
Depth of pubic arch.....	2 "
Shortest distance from tip of coccyx to promontory of sacrum.....	$3\frac{1}{2}$ "
Following curve of sacrum.....	$4\frac{3}{8}$ "

The three lower vertebræ were left attached to the pelvis, and present marked borders. A vertical line touching the outer surface of the third lumbar vertebra, the pelvis being held in the erect position fell precisely half an inch in front of the crest of the symphysis pubes.

The femora were removed and left attached to the pelvis. Both presented marked anterior curvature. The right larger than the left; the right being 10 inches from great trochanter to lowest point of external condyle; the left, 9 inches between the same points.<sup>1</sup>

Death was evidently due to pyæmia. Had the surroundings been at all hygienic, or could the woman have been, at any time after I saw her, removed to a hospital, she would probably have recovered. On two previous occasions craniotomy was performed on her, in 1869 by Dr. Girvin; in 1872 by Dr. Parry; each time at the Philadelphia Hospital. Dr. Parry reported his case in the *Transactions* of this Society of last year, making it the basis of his excellent article, entitled "Craniotomy and the Cesarean Section in small pelvis." (See this JOURNAL, February 1873, p. 644.)

To Mr. Percival Loder I am much indebted for faithful and judicious assistance during the entire treatment of the case.

After reading the history of this interesting case, Dr. Parrish presented the pelvis and attached bones to the Museum of the

<sup>1</sup> The pelvis and attached bones are now in the Museum of the Obstetrical Society of Philadelphia.

Society. Owing to the absence of Dr. J. S. Parry, who delivered Josephine Scott on a previous occasion, the discussion on this paper was postponed.

DR. GOODELL then gave the following history of a case of

VESICO-VAGINAL FISTULA, CURED BY LOCAL APPLICATIONS.

The patient, a primipara, was an undersized woman, with a flat pelvis. The head was large, and the vertex presented in the right occipito-posterior position. Not realizing the difficulties of the case, and wishing to put to the test Simpson's forceps, which, he had lately imported directly from the original manufacturers in Edinburgh, he applied it, as recommended by its advocates, in the transverse diameter of the pelvis. After very hard traction of about an hour's duration, the head entered the excavation, but in proportion to its descent the vertex rotated more and more towards the sacrum. He therefore removed Simpson's forceps and applied Hodge's to the sides of the child's head. After half an hour's further hard traction, he succeeded in rotating the vertex anteriorly, and in delivering the woman of a lusty child weighing eight pounds and fourteen ounces. By the passage of the shoulders the perineum was torn to a considerable extent, but three metallic sutures were at once put in, and it, in the end, remitted perfectly. On account of this laceration the bladder was emptied by the catheter for five days. On the tenth day the urine began to dribble away from the vagina. Upon an examination, he found, to his dismay, a slough as large as a silver quarter, near the neck of the womb, and in it an opening communicating with the bladder. He at once cauterized the whole slough with fuming nitric acid; repeated this application three days later, and on the intermediate and following days applied a solution of one drachm of nitrate of silver to one ounce of water. For five days all the urine escaped from the vagina. It then began partly to be passed from the urethra, in very small quantities at first, but daily in increasing amount. At the end of five days more, the opening, much to his delight, closed up entirely. The lessons he derived from this instructive case were three-fold: To be more charitable in future to those physicians who are unfortunate enough to meet with cases of vesico-vaginal fistulae in their practice; to regard these fistulae, when of medium size, as curable in their acute stage; to discard Simpson's forceps as a dangerous instrument in operations at or above the brim.

DR. INGLAM doubted, whether, with all this manipulation, the injury should be attributed to the use of Simpson's forceps.

He could not see why this forceps should be more injurious than Hodge's, if the traction were made in the direction of Carus's curve.

DR. GOODELL replied, that he by no means attributed the injury directly to the blades of Simpson's forceps, but to the fact that by this forceps hard and continuous traction cannot be made in the curve of Carus. From its peculiarity of construction this instrument admits of linear or direct traction alone, which necessarily subjects the pubic structures to very great pressure. But when the woman lies on her back, by firm downward and backward pressure upon the lock of the Hodge forceps, and by raising the handles proportionately, traction can be made in the curve of Carus, and away from the pubes, thus relieving its structures from the brunt of the pressure.

DR. C. H. THOMAS asked where the fistula was seated; and whether it would not have been wiser to introduce stitches at once, rather than trust to local applications.

DR. GOODELL replied, that the opening into the bladder was in the centre of a sloughing surface, which could not have held the stitches. It was situated about half an inch from the juncture of the anterior wall of the vagina with the cervix.

DR. A. H. SMITH, thought that the injury was due, not to the kind of forceps used, but to its application in the transverse diameter of the pelvis. The blades are intended to be applied to the sides of the child's head, whatever the position, and when thus used, the mother's tissues are protected by the bulging of the child's tissues through the fenestræ.

#### CANCER OF THE CERVIX UTERI.

DR. J. V. INGHAM exhibited a specimen of medullary cancer of the cervix uteri, with the following history:

Ann D., aged 40, widow. Married at 18. Has had five children, the labors were easy and she recovered perfectly from each one. Nine years ago she miscarried, and since that time she has been irregular in her menstrual periods, but recollects no other trouble. In October, 1873, a profuse hemorrhage from the vagina occurred, and on the 31st of that month she was admitted to the surgical wards of the Philadelphia Hospital. During her stay in these wards she had profuse hemorrhage from time to time, having, as she states, lost bucketsful of blood.

On the 3d of March, 1874, she was transferred to the ward for the diseases of women. At that time she had a continued hemorrhagic discharge, which, however, was soon checked by local applications of liq. ferri persulph. When Dr. Ingham took charge of the ward, April 1st, he found her greatly

emaciated and extremely feeble, but losing no blood. She did not complain of any pain or abdominal soreness, and was positive that she had never had any; the so-called cancerous cachexia was well marked. A few days later he died, apparently from œdema of the lungs.

On making the post-mortem examination the cervix uteri was found to be the seat of a medullary growth, which had destroyed it. The adjacent tissues were healthy. The lungs were markedly œdematous. The liver and kidneys had undergone considerable fatty degeneration. The cause of death was evidently an acute œdema of the lungs, the patient having been greatly weakened by her previous hemorrhages. The doctor thought that the interesting point in this case was the small amount of destruction of tissue, and at the same time the long-continued and profuse hemorrhages. It was also interesting, he thought, to notice the entire immunity from any pain, abdominal or pelvic.

DR. CHARLES H. THOMAS then related the following history of a case of

#### ANTE-NATAL DEVELOPMENT OF NINE TEETH.

This case was brought to my notice by Doctress Estelle A. Benedict, then a student of medicine at the Woman's Medical College of Pennsylvania, who informed me that she had attended a woman in her confinement (Dec. 28th, 1873), and that the child, which was normally constituted otherwise, had nine (9) perfect teeth when born. The child was first visited by me when it was four weeks old (January 27th, 1874), in company with Dr. James S. Myers, he having seen it previously, and very soon after its birth.

We found an emaciated male infant, evidently suffering from marasmus and near its death, having five (5) teeth in place and four (1) distinct conical fleshy papillæ, from which a corresponding number of teeth had already been removed. These latter are herewith presented, being two incisors and two molars. It is worthy of note, in passing, that these teeth loosened of their own accord, and not from the pressure of others from beneath. In addition to these, a number of small whitish nodules could be seen and felt along the line of the gums, above and below, lying underneath the mucous membrane, and evidently marking the location of all the other deciduous teeth. No change had taken place in these, as I am informed, up to the time of the child's death, which occurred at the sixth week.

The mother complained of the bite of the child while nursing as being very severe from the first, and despite much urg-

ing to the contrary, on the part of her medical attendant, she entirely discontinued putting it to the breast before it was three weeks old.

Whether or not an instinctive or superstitious shrinking from close contact with such a monstrosity contributed to this conduct is not certain, but it seems very probable.

Certain it is that the idea of horror is not infrequently associated with such cases, and in this connection these lines, from Richard III., are not without a certain interest:

*Queen Margaret to Duchess of York.*

"Forth from the kennel of thy womb hath crept  
A hell-hound, that doth hunt us all to death;  
That dog that had his teeth before his eyes."

DR. CURTIN recalled two cases of ante-natal teeth which occurred in his practice. The first mentioned had the two front upper incisors and two below. The child died when about three weeks old.

The second had the two upper front incisors. These teeth dropped out when the child was about two months old, and were replaced by the ordinary deciduous teeth, which he was informed is usually the case with this kind of teeth.

There is a superstition among nurses, that the child that is born with teeth dies early.

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## QUARTERLY REPORT ON OBSTETRICS AND DISEASES OF WOMEN AND CHILDREN.

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ON THE NATURAL AND ARTIFICIAL ELIMINATION OF SESSILE (INTRAPARIETAL) UTERINE FIBROIDS. BY DR. MÄNNEL, of Dresden. (*Vierteljahrschr. für die prakt. Heilk.*, 1874.)

ACCORDING to Cruveilhier, every uterine fibroid is covered on its intra-uterine surface with mucous membrane and a layer of muscular tissue of greater or less, occasionally even only microscopic thickness; real *submucous* fibroids, therefore, do not occur. Between the muscular layer and the fibroid is an accumulation of loose cellular tissue, from which the tumor can be more or less easily enucleated.

The absorption of uterine fibroid growths by medicines seems out of the question, and such cures are probably only instances

of hyperplasia of the uterus or plastic exudation in its vicinity. The disappearance of oedema of the tumor, or the excessive loss of fluid (during cholera, Chiari) may simulate a real diminution in size of the fibroid, which, however, is generally only of temporary duration, and may frequently be witnessed after each menstrual period. The only recorded case of the total disappearance of an undoubted fibroid of the size of a child's head in the non-puerperal condition is explained by MATHEWS DRUCEAN as being the result of the spontaneous enucleation and expulsion of the tumor without the knowledge of the patient. The value of HILDEBRANDT's hypodermic injections of extr. secal. cornuti must be determined by further observations. The diminution in size and disappearance of fibroids in the puerperal state is a well-known fact. DESSAUL, TARNIER, and GUYON (*Gaz. des hôp.*, 1869) were of the opinion that the causes are the diminished supply of blood, and a participation in the physiological fatty degeneration of the uterine muscular fibres. WEST is of different opinion. SEANZONI, LORRAIN, and AILING report such cases.

The actual elimination of a fibroid occasionally takes place by means of the *sloughing* of the tumor, which commences generally from some superficial lesion, or from constriction of the lower portion of the tumor by the os, spreads up over the whole tumor, breaking down and softening its tissue by suppuration until the whole growth is destroyed and expelled, either in the shape of pus and shreds, or by piecemeal. An active participation of the whole system, peritonitis, and septicæmia render this process full of danger. Cases are reported by SÄXINGER, CHIARI (four cases—two fatal), LEE, CHASSAIGNAC, DEMARQUAY, BAKER BROWN, KRISTELLER, C. BRAUN. WEST caused partial gangrene by puncturing a fibroid of the size of a seven months' child in a puerperal uterus, the woman dying on the sixth day. SPIEGELBERG relates a similar case. RETZIUS was the first to practice the method intentionally; he applied the actual canterly to the depth of  $\frac{1}{2}$ ", and repeated the operation twice after an interval of two weeks; the tumor decreased materially in size, and no constitutional derangement was observed. BAKER BROWN endeavored to remove the whole tumor by "gouging" out piecemeal, and thereby causing intense inflammation and suppurative separation of the fibroid. JÄNGER. (*Gaz. de Strassb.*, 7, 183) made deep incisions into the tumor, touched them with lunar caustic, and repeated the operation seven or eight times in intervals of a week, entirely destroying the tumor. The injection of sol. arg. nitr. into the tumor with a hypodermic syringe would doubtless produce the same result. The dangers of these procedures are: pyæmia, septicæmia,

peritonitis, venous thrombosis, death from exhaustion. BAKER BROWN'S deep incisions into the cervix are useful in controlling hemorrhage, and possibly thus diminishing the size of the tumor; they act, by removing the constriction of the lower portion of the tumor by the cervix, and thereby relieving venous congestions and metrorrhagia. SIMS believes their benefit to result from the endometritis following the incisions, which agglutinates the contiguous surfaces of the tumor. MÄNNEL thinks, if this were the case, such agglutinations would be more common, considering the present frequency of bilateral cervical incisions. The method of discision, besides being dangerous, is uncertain, for CHARI refuted KIDD'S opinion, that complete destruction of the tumor always follows, by relating a case in which the stump of the fibroid healed without any inflammatory action: MÄNNEL relates a similar case at length.

The spontaneous expulsion (ennecleation) of fibroids may also occur by means of the uterine contractions: a small defect in the covering of the fibroid may arise, particularly during confinement, or from some unknown cause. The uterine contractions enlarge this opening, push the tumor into it, and gradually enucleate it. All fibrous polypi without a mucous envelope, originate in this manner. MATHEWS DUNCAN and the author report such cases of fibroid polypi. MICHAUK (*Dissert., Leipzig*, 1866) describes a case where a fibroid, weighing over one lb., was expelled on the 44th day after confinement. The left side of the head of the child had been flattened by the pressure of the tumor, and the incentive to the expulsion of the latter was probably given by some injury done to its envelope.

DANYAN and LANGENBECK enucleated large fibroids of the cervix which obstructed delivery. KIWISCH and SENDERLING removed a fibroid of the uterine cavity with the fingers on account of post-partum hemorrhage. HENRY YELD (*Brit. Med. Jour.*, June 3, 1871) removed a fibroid, weighing two kilogrammes, and measuring twenty centimetres in circumference, from a woman, immediately after confinement. RAMSEY removed a tumor of  $1\frac{1}{4}$  kilogrammes after delivery, by making a puncture, and enucleating with his fingers, and giving ergot and opium. GRIMSDALE'S case, in which severe hemorrhage from a uterine fibroid occurred in the fourth month of pregnancy, and in which the cervix was dilated by sponge-tents, the fibroid incised and manually enucleated on the fifteenth day, when pyæmia seemed imminent, is reported also by SIMS. Conception followed in this case after three weeks, as also in a case operated upon by MATHEWS DUNCAN a year after the operation.

Enucleations of fibroid tumors in the non-puerperal uterus are much more numerous. The French first practised the



operation on the corpus uteri (AMUSSAT 2, MAISONNEUVE 3, BOYER 1, BÉRARD 2 cases), and were followed by the Americans (ATLEE 11 cases), and English, of whom MATHEWS DUNCAN particularly followed a rational method. If the cervical incisions and the division of the mucous membrane covering the tumor did not permanently arrest the hemorrhage, the actual enucleation and extraction of the tumor was at once performed, the cervix, if necessary, having been deeply divided, to permit free ingress to and egress of the tumor. The incision into the capsule of the fibroid was made generally with a blunt-pointed bistoury at its most dependent portion, in a direction corresponding to the longitudinal diameter of the tumors (DUNCAN, ATLEE). MARION SIMS divides the mucous membrane transversely at the junction of the wall of the uterus and the tumor, and proceeds to isolate the tumor directly from the uterine wall. The author adopted the same plan in his two cases, because but a small portion of the tumor projected into the uterine cavity, the greater portion being deeply imbedded in the muscular tissue. The division of the capsule is also inadvisable, if the tumor projects like a cylinder into the uterine cavity, when it is better to perform the enucleation from the uterine wall itself. If the fibroid projects semi-spherically into the cavity of the uterus, the capsular division is indicated, because the tumor is likely to be enucleated through the incision. There is generally but little hemorrhage from this incision (MEADOWS mentions an exception). Usually the menses are more profuse, until the tumor is removed, owing to the laceration of the often quill-sized veins under the mucous membrane. DUNCAN saw this in one case, SIMS did not observe any excessive menstruation in a case where the enucleation lasted six months. The enucleation is performed at intervals of several days (DUNCAN, SIMS, GRESSEROW), weeks or months (SIMS, MEADOWS), by introducing the index and middle fingers, or a sound (SIMS), between the tumor and the uterus, and moving them about until the adhesions are effectually divided; new adhesions will usually form during the interval, which require to be divided with the old ones (DUNCAN, McCLINTOCK, SIMS, MÄNNEL). SPIEGELBERG attempted to prevent their formation by introducing strips of oleo-carbolized linen, but with doubtful success.

Certain circumstances will cause us to abandon the more natural and less dangerous gradual manner of enucleation for the rapid, immediate removal of the tumor; such are violent hemorrhage, gangrene of the tumor, septicæmic symptoms, exhaustion (DUNCAN, GRESSEROW, MÄNNEL report cases). Gangrene of the tumor is more likely to occur during the spontaneous suppurative eliminative process, although rare even there. The remaining

portion of partially extirpated fibroids would seem to be more liable to suppuration, but there are a number of cases to prove the contrary (LANGENBECK, CHARI, CHROBAK, in whose cases suppuration did not set in until after the third removal of a portion of the tumor).

A portion of a fibroid tumor is removed on account of its size, or undue pressure on the surrounding organs; sometimes it is necessary to remove the lower portion in order to reach and remove the upper, which can be done in one sitting, or deferred to a later period (MAISONNEUVE, RETZIUS). The hemorrhage is apt to be excessive in these cases; SIMS and VELPEAU lost patients in this way. SPIEGELBERG, CHROBAK, and DUNCAN saw profuse flooding; SCOTT and HALL DAVIS, however, mention but very slight hemorrhage, although they removed tumors of 2 lbs. and 1 lb. weight by incision, *écraseur*, and hand in 3 parts in one sitting.

DUNCAN controlled the hemorrhage in one case by partially removing the tumor; HUTCHINSON in one, McCLECKOCK and DEXHAM in three cases, were not so successful. A partial removal of a fibroid would seem to be indicated only when its entire removal is soon to follow. A diminution of the metrorrhagia need hardly be expected, as a rule. CORRY denounces partial extirpations, and considers them fatal, in which opinion he is evidently mistaken.

WEST, in his "Diseases of Women," has given a tolerably complete list of all total enucleations of fibroids of the *body of the uterus* up to 1858, omitting all polypi or pediculated fibroid tumors and fibroids of the cervix. MÄNNEL has endeavored to compile all enucleations omitted by WEST, or performed since; the operation was performed in all but two cases for violent metrorrhagia; in one of his and in GUSSEROW's case for compression of the neighboring organs. The cases number 22; total enucleation, 17; partial 5. *Total*: Grimsdale, Henry Yeld, Senderling, Kiwisch, Ramsey, Retzius, Scott, B. Langenbeck, J. Hall Davis, Gusserow, R. Chrobak, Mathews Duncan (5 cases), Männel; *partial*: Marion Sims, Spiegelberg, Männel, Müller (2 cases). In all these cases but those of SIMS, CHROBAK, and SPIEGELBERG the hemorrhage during the operation was very slight; in two (SPIEGELBERG's and MÄNNEL's) severe secondary hemorrhage occurred. Only three cases terminated fatally (SIMS, YELD, SPIEGELBERG),<sup>1</sup> certainly a very favorable percentage; unfortunately many fatal cases have doubtless never been

<sup>1</sup>One of Müller's cases died after sixteen months, after a repetition of the operation for a newly-developed sarcomatous degeneration of the tumor, and the death therefore does not come under the category of those following extirpation of a uterine fibroid.

published. WEST compiled twenty-seven cases, fourteen of which were fatal; together forty-nine cases, of which thirty-two terminated favorably and seventeen fatally. Of these exhaustion, profuse hemorrhage (Chiari lost his patient therefrom as late as the thirty-sixth day), septicæmia, thrombosis of the iliac vein (Baker Brown), peritonitis, with and without peritoneal lesion, were the causes of death.—

In this connection we would briefly refer to a highly interesting and valuable paper on "INTRA-UTERINE FIBROIDS," by Dr. J. MARION SIMS, published in the *N. Y. Medical Journal* for April, 1874, which possibly may have escaped the notice of some of our readers.

Dr. SIMS relates in detail six cases of large interstitial uterine fibroids successfully and safely removed by him, and also two cases in which death followed the operation, one in which the patient died after the introduction of a preparatory sponge-tent, an abscess having burst into the peritoneal cavity and produced peritonitis, and one in which the sponge-tent was followed by violent constitutional disturbance, the patient barely escaping with her life.

The guiding principles in the artificial removal of intra-uterine fibroids are: 1. The cervical canal must be freely open. 2. The tumor must be freed from the restraint of its investing capsule.

The *modus operandi* is as follows: The patient, who has been placed under the best possible hygienic influences, the cervix having been widely opened by five or six sponge-tents introduced the previous night, is placed in the left lateral semi-prone position, and the vagina opened with a Sims speculum. 2. The presenting portion of the tumor is seized at its most dependent portion with a strong vulsellum, and pulled forward. 3. The capsule of the tumor is opened with scissors at the place of its attachment to the posterior and lateral portions of the cervix, and here we must be sure not to dissect the capsule from the cervix, but to cut squarely into it and then pass the index-finger through the opening thus made between the tumor and the capsule, which should be left attached to the walls of the uterus. The capsule should be divided all around and in close proximity to the borders of the cervix. 4. While the tumor is firmly held and pulled forward by the hook or vulsellum, the enucleator (a blunt-pointed rectangular hook) is rapidly pushed up between the tumor and its capsule as far as the fundus in various directions, and swept around the tumor until all the cellular tissue and strong fibrous bands connecting it with its capsule are

severed: as soon as this is done, 5, a double hook (the tumor-hook) is passed up along the posterior surface of the tumor as far into the cavity of the uterus as possible, and the tumor then pulled down and slightly rolled on its vertical axis, the enucleator still assisting to complete the final separation of the tumor. As the tumor gradually comes down, the hook is passed farther up and hooked in again, and thus the growth rolled out of its bed, and brought outside of the genital organs. If the os is not sufficiently dilated to allow the passage of the tumor, it should be divided by bilateral or crucial incisions down to the insertion of the vagina. 6. After the removal of the tumor, loose shreds are cut off with the scissors and the uterine cavity firmly plugged with iron-cotton for 24 or 36 hours. In case of fetid discharge and septic symptoms the frequent and thorough washing out of the uterine cavity with carbolized warm water is practised and strongly recommended. The individual peculiarities of each case may, of course, modify the operation in various ways.

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THE DIAGNOSIS OF CYSTIC MYOMATA OF THE UTERUS AND THEIR INTRAPERITONEAL ENUCLEATION. A New Method of Operation. By PROF. OTTO SPIEGELBERG, Breslau. (*Arch. f. Gyn.* vi., 3, 1874.)

A PATIENT with a supposed ovarian tumor was subjected to ovariectomy. January 18, 1874. On opening the abdomen the ovaries were found to be unconnected with the tumor, which arose from the posterior aspect of the uterus, from three centimetres below the fundus to the insertion of the vagina, extended upwards twelve centimetres above the umbilicus, was covered entirely by the uterine peritoneum and the posterior layers of the broad ligaments, and was distinctly ascertained on incision and puncture to be a cystic tumor of the uterus. After a bucket had been half filled with the dark-yellow fluid from the tumor, which flowed from numerous punctures and coagulated at once and completely (Aflee's test for fibro-cystic growths of the uterus), the growth, which looked on its cut surface like a coarse sponge, was drawn out, ligated, and removed with the knife. Diffuse hemorrhage called for the removal of the remainder of the tumor, which was accomplished with the fingers and the handle of the scalpel; a piece of the size of the fist being enucleated without removing any portion of the uterus itself. The large cavity on the posterior surface of the uterus was closed by eighteen deep silk sutures through the peritoneal envelope, and the hemorrhage thus arrested. The sutures were carried out of the abdominal wound, and a drainage-tube passed

from the latter through the recto-uterine pouch into the vagina. The abdominal wound was closed in the usual manner.

The patient nearly succumbed to an apparent septic infection on the second day, but rallied after a copious discharge of serous, offensive fluid from the drainage-tube and abdominal wound, and promised to recover. On the sixteenth day she suddenly died during the night, as S. supposes, in consequence of pulmonary embolism from a pelvic thrombus, for an autopsy was not obtained.

A macro- and microscopic examination of the tumor showed it to be a *myosarcoma lacunare vel cysticum*.

The diagnosis of cystic fibromata of the uterus by means of physical examination alone is impossible (Péan and Spiegelberg both acknowledge this), and they are generally taken for ovarian tumors and their true nature discovered only when the abdomen is opened for ovariectomy. The test first mentioned by Atlee, and afterwards corroborated by Spencer Wells, Koeberle, and Peaslee, *the rapid and complete coagulation of the fluid*, its character of transsuded fluid, dark-yellow color, transparency, the abundance of fibrine and albumen contained in it, and the poverty of morphological elements, blood-cells, connective-tissue cells, etc., all these characteristics point out the fibro-cystic nature of the tumor. The explorative puncture, therefore, is the only certain diagnostic test for uterine cysts.

The operation of *enucleation with suture of the peritoneal envelope of the cystic tumor* is claimed by Spiegelberg as a new method, and is declared much more favorable for recovery than the removal of a portion or the whole of the uterus; it might be employed also after the excision of the bulk of solid uterine tumors through an abdominal wound.

Sims has enucleated small cysts of the posterior uterine wall and broad ligament, but has used their serous envelope as a pedicle which he attached to the abdominal wound; once only did he unite the wound left after the enucleation of a very small cyst with sutures which were left "*perdues*" in the abdominal cavity.

If the sutures are to be left in the abdomen, catgut would be preferable; if silk is used, the sutures should be passed through into the vagina, and would thus assist drainage. In this case they were passed out of the abdominal wound, because after the operation the uterus stood very high, almost in contact with the abdominal wall.

In conclusion, Spiegelberg avows himself an enthusiastic adherent of the system of vaginal drainage in ovariectomy recommended by Sims, and is confident that the eight cases of ovariectomy which he lost in consequence of septicæmia would

have been cured if drainage and careful washing out of the peritoneal cavity had been employed. He says that in future he will use Sims' method in every case of complicated gastrotony, and considers it to be an extraordinary advance in intra-peritoneal surgery, "an additional leaf in the crown of merit of the celebrated American gynecologist."

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ON EXUDATIONS IN THE NEIGHBORHOOD OF THE FEMALE GENITAL CANAL. By PROF. SPIEGELBERG, Breslau, with 2 plates.<sup>1</sup> (*Klin. Vorträge*, 71.)

INFLAMMATORY indurations, nodules (tumors), and contractions of the uterus and its immediate vicinity are among the most common of gynecological affections, and have only recently been properly appreciated. At the time of Lisfranc, inflammatory processes in the genital sphere were simply denominated "engorgement;" later they were all called metritis and oöphoritis. Marchal de Calvi, Nonat, Bernutz, and Goupil, and other French authors first gave us a clear insight into these conditions. Some of these authors (particularly Bernutz and Goupil) considered the inflammation to be confined to the serous membrane covering the genital organs, and forming the well-known pouches and duplicatures, the disease then being essentially a pelveo-peritonitis, while others believed the seat of the inflammation to be the cellular connective tissue which envelops the genital canal and constitutes the parenchyma of the broad ligaments, and the exudations and nodules to be the result of this pelvic cellulitis. The dispute as to whether peri- or parametritis is the more common is not yet decided, and the distinction between the two is often difficult. Particularly among non-specialists, the knowledge of the situation, importance and diagnosis of these peri- and para-uterine affections is still a very vague one, owing principally to incorrect and indefinite ideas on the anatomical relations of the peritoneum and the cellular tissue and the genital organs, and of the former to the latter.

In a sagittal section through the median line of the pelvis we find (as is indicated in the somewhat modified sketch of Kohlrausch, Plate I.) the serous membrane of the fundus and body of the uterus closely and immovably attached to the muscular coat as far down as the middle of the organ; near the so-called isthmus, somewhat above the internal os the connection becomes looser, the peritoneum withdraws before and behind from the uterus, and the subserous coat becomes distinct. Anteriorly the peritoneum, when the bladder is only partly filled, is reflected in an acute angle on the latter at the level

See end of this Number.

of the internal os; the subserous layer, however, is so loose, the peritoneum, corresponding to the mobility and varying tension of the bladder, so movable, that the bottom of the vesico-uterine excavation is situated sometimes higher and sometimes lower, and the excavation may even disappear completely, if the bladder is very full. Doubtless between the attachment of the anterior vaginal wall to the cervix uteri and the anterior point of reflection of the peritoneum, there is a layer of cellular tissue—below firm and interlaced with muscular fibres which go from the cervix uteri to the bladder, above very loose and meshy, everywhere entirely free from adipose tissue—which can become the seat of inflammation and suppuration (ante-uterine cellulitis.)

On the posterior uterine wall at the height of the isthmus the peritoneum likewise leaves the muscle; instead of descending in a straight line directly to the cervix, it forms near the upper cervical portion (Fig. I. *a*) a thick fold, which in a transverse section looks like an elevation (transverse section of the combined semilunar folds of Douglas), and which is well supplied with vessels and loose cellular tissue deficient in fat. From this elevation the peritoneum covers the posterior wall of the cervix, and a portion of the posterior vaginal wall one to two centimetres in length, and is quite closely attached to the vaginal wall. The subperitoneal coat thus become thinner and thinner the farther down it reaches; at the elevation named it is the thickest, and contains many veins and lymphatic vessels. The posterior point of reflection of the peritoneum, the base of the pouch of Douglas, forms a somewhat less obtuse angle than the anterior, and is situated about six centimetres above the anus. This arrangement thus admits the possibility of a retro-uterine or retro-cervical cellulitis.

On the sides down to the middle of the body of the uterus the peritoneum is closely adherent, although not as much so as anteriorly and posteriorly. At the above-mentioned spot, however, it leaves the uterine border, and its lamellæ are separated also in a sagittal direction; the subperitoneal coat thus forms on the sides of the uterus a thick triangular mass with its point upwards. The peritoneum then descends into the pelvic cavity, constitutes the roof of the broad ligament, and is reflected laterally on the iliac fossa, anteriorly and posteriorly on the wall of the small pelvis. Below this serous boundary (Fig. II.), between it and the levator ani muscle and its fascia (the diaphragma pelvis *h*), a powerful layer of cellular tissue is situated, the parenchyma of the broad ligaments. Two cavities thus arise at the side of the uterus; the upper, *cavum pelvis peritoneale* (*A*), which forms a part of the peritoneal cavity; the

lower, *cavum pelvis subperitoneale* (B), situated between the peritoneum and the pelvic diaphragm (Luschka) which contain the so-called pelvic cellular tissue; below the latter is situated the perineal region which communicates only by a few fissures with the subperitoneal, and is distinctly separated from it. (Luschka calls it *cavum peritoneale subcutaneum*, C.) Of these cavities the subperitoneal is pathologically the most important, for it contains not only many large vessels, but also venous plexuses and numerous lymphatic canals and glands, and nerve-ganglia; that portion of cellular tissue adjacent to the uterus is particularly loose and rich in veins and lymphatics, the roots of which are situated in the uterus, and connect with the ante- and retrocervical or retrovaginal submucous tissue. The cervix uteri thus appears enveloped in a fatless layer of cellular tissue, which becomes more and more dense as it proceeds downwards, and is of particular importance to us—1, because it is intimately connected with the parenchyma of the cervix uteri, in a measure forms its adventitia, its capsule; 2, because it conducts not only blood and lymphatic vessels to and from the uterus, but itself forms a cavernous tissue (Rouget); Fig. II. represents the thick venous plexuses; 3, because it therefore easily participates in all irritation and congestion of the cervix, even without being directly injured, reacts on the slightest insult by inflammatory congestion, and constitutes an exceedingly favorable spot for the reception and propagation of septic matter by the blood and lymphatic vessels. For the puerperal inflammation of this cellular envelope of the lower portion of the uterus and the fornix vaginae Virchow introduced the name of *Parametritis*; later this term was extended to inflammation of the broad ligaments, and even the whole pelvic cellular tissue (Mathews Duncan), and some confusion caused thereby. We call the layer of cellular tissue enveloping the lower segment of the uterus and the fornix vaginae to the depth of two centimetres, and containing numerous blood and lymphatic vessels, the *parametran tissue*, and its infiltration, or eventually induration, *parametritis*, or better, *parametran inflammation*; the inflammation of the pelvic cellular tissue, generally, including that of the broad ligaments, the rectum, the iliac fossæ, the anterior abdominal wall, etc., we term, with the French, *phlegmon of the broad ligaments* or of the *pelvic cellular tissue*.

An *intra-peritoneal* exudation is very seldom situated before, almost never at the side, but nearly always behind the uterus and vagina in Douglas's cul-de-sac; in its fluid condition it flows to the deepest portion of the peritoneal cavity, which, under ordinary circumstances, is the bottom of Douglas's pouch.



It will appear as a tumor only when the intestines have become agglutinated together, and with the pelvic viscera and peritoneal lining, and a roof has thus been formed over the exuded mass. This fact may be observed, especially after ovariectomy, when febrile symptoms are followed by the perception of a firm pelvic exudation several days later; but this capsule may be formed much sooner, and doubtless not a few of the retro-uterine hæmatocèles reported are nothing but such retro-uterine exudation-tumors. These are always smooth to the touch, equally convex, descend more deeply in the median line, occasionally far below the external os (for Douglas's pouch, in women who have borne many children descends still farther), never touch the wall of the small pelvis laterally, but approach it from below upwards, assuming an ovoid shape. The uterus is always pushed forward, either directly forward or also upward, according to its condition or the depth of Douglas's space. Intraperitoneal exudation-tumors may be other than retro-uterine, if they develop within cavities formed by old adhesions and pseudo-membranes between the uterus and the bladder, or laterally between the uterus, tube, and ovary; adherent intestinal convolutions in the posterior portion of the peritoneal cavity may also simulate a lateral tumor. The high situation of these tumors, the constant position of the lateral ones in the posterior portion of the peritoneal cavity, as a rule, secure their diagnosis.

*Parametran phlegmonous inflammations form tumors from the moment of their development*, because they are everywhere surrounded by tissue. Their consistence is first doughy, then fluctuating, then firm, hard, knotty, tendinous; they occur at any side of the cervix, most rarely in front, because the cellular tissue there is most scarce, and do not generally project far into the vagina, but rather upwards, where they are palpable between bladder and uterus as ante-uterine tumors. An exudation behind the cervix and fornix vaginae may be parametran, and retrocervical parametritis is not at all rare; the exudation is, however, often mistaken for an intraperitoneal one, with which it is frequently combined. Differential signs are, its diffused lower boundary, its gradual passage into the broad ligament, its chiefly retrovaginal situation, and the displacement of the cervix upwards and forwards. Parametran exudation tumors are most frequently situated laterally near the cervix, where the subperitoneal cellular tissue is most abundant, and offers least resistance to inflammatory accumulations. They are closely attached to the cervix, encircle it in front and behind, and appear to proceed directly from it. If they are extensive, they spread to the broad ligament, the phlegmon of

which may, however, arise without parametritis, and occupy the whole subperitoneal cavity, sometimes nearer, sometimes farther from the uterus, either in the anterior or in the posterior part of the cavity (exudation under the anterior or the posterior plate of the broad ligament). The tumor always extends far downwards, shortens the corresponding half of the vagina, and can be felt from the abdomen only when very large; its margin is rarely sharp, usually irregular and knotty, gradually merging into the healthy surroundings; the nodule appears grown to the pelvic wall. If the parametran tissue is not implicated and the tumor small, the uterus appears free, otherwise the cervix is pushed to the opposite side; or if the exudation has begun to shrink, drawn to the diseased side, and fixed there. If the tumor is situated in the *anterior* portion of the subperitoneal cavity, it is felt in and over the inguinal region, hard as a board, closely adherent to the anterior abdominal wall with its sharp upper border, and gradually disappearing in the iliac fossa. If the tumor is in the *posterior* portion of the cavity, it can be felt laterally behind the cervix, firmly attached to the sacrum, either enveloping or displacing the rectum. In rare cases S. has found a dense exudation-nodule lying alone at the lower border of the iliac fossa, spreading with a small irregular portion into the external half of the broad ligament (below the peritoneal and on the iliac fascia, proceeding probably from the subperitoneal tissue, near the ostium tubae or the ovary). Intraperitoneal exudations are either absorbed, leaving indurations, adhesions, or pseudo-membranous formations of the peritoneum, or they suppurate and open into adjacent cavities. Phlegmonous exudations frequently suppurate; but large accumulations of pus, like an abscess, are rarely to be felt during life. The pus generally works its way into the rectum, vagina, or rarely into the peritoneal cavity, almost never through the perinaeum, owing to the strong pelvic diaphragm; occasionally following the round ligament, it points near Poupart's ligament, or the broad ligament in the iliac fossa; sometimes it ascends into the retroperitoneal cellular tissue. Parametran and pelvic phlegmonous exudations generally leave induration and retraction of the cellular tissue, nodules, and cicatrices. Peritoneal and cellular exudations may occur together. S. is inclined to consider the latter to be generally the primary affection.

The *etiology* of these inflammatory processes is found principally in injuries and irritations of the lower uterine segment and the cervix, occurring either during puerperal convalescence (the most frequent cause) or in the non-pregnant condition; such are: violent physical shocks to the whole body, excessive

coition, diagnostical and therapeutical manipulations (cauterization of the cervix, dilatation by sponge-tents and laminaria, injuries with the point of the sound, incisions and amputations, forcible traction on the cervix, etc.). Septic infection may proceed from a trivial injury, and spontaneous, idiopathic inflammation of the cervix or surroundings may occur, induced by irritation of the ovary and small menstrual ecchymoses in the broad ligament, etc.

*Pelvi-peritonitis* arises either in consequence of paracervical inflammation, or of rupture and tension of pseudo-membranous adhesions generally, as a result of endometritis or salpingitis, or menstrual derangements. *Parametran nodules* thus generally originate in diseased conditions of the lower segment of the internal genital organs, *phlegmonous inflammations* of the broad ligament succeed those of the parametrium or parovarian tissue; *pelvi-peritonitic exudations* accompany affections of the corpus uteri and the Fallopian tubes, particularly of the internal surface of these organs, are much rarer than the former, more frequently of a secondary character, and almost never run so secret a course as the cellular inflammation. Finally, para- and peri-uterine inflammations still offer a sufficient field for clinical and anatomical investigation.

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## REVIEWS AND NOTICES OF BOOKS.

A PRACTICAL TREATISE ON THE DISEASES OF WOMEN. By T. GAILLARD THOMAS, M.D., Prof. Obstetrics and Diseases of Women and Children in the College of Physicians and Surgeons, New York, etc. etc. etc. Fourth edition, thoroughly revised, with one hundred and eighty-six illustrations. Philadelphia: Henry C. Lea. 1874. 8vo, pp. 800.

A work that passes through four large editions within five years, and is honored by being translated into three different languages, must certainly be one of unusual merit. Such weighty endorsements of an author's labors take considerable from the value and importance of any individual criticism, and even almost disarm that critic who may for some reasons not entirely concur in the universal verdict of approbation. A book that has already been so frequently subjected to careful study and criticism on the appearance of each edition can-

not, in so short a period of time as the few months between the successive editions, contain so very much new matter, and be so much changed in the general facts of its teachings, as to require or call for a general and exhaustive review; but what will be more fitting and of more interest, a noting of the improvements in the new issue over the preceding, and of such changes, and addition of or new material, as the author may have found either necessary or advantageous.

Gynecology, it is admitted by all, has made stupendous advances within a few years, and the one who has, perhaps, undeniably done the most to bring it to its present exalted position in this country especially, as a recognized and important specialty, still lives to enjoy the honors and results of his labors and teachings—we refer to J. Marion Sims. Profiting by the latter's teachings, making improvements in many of his operations, and originating some new ones, as well as new methods of study and diagnosis, many of his students and junior practitioners have equalled Sims in skill and reputation. Of such, the names of Emmet, Peaslee and Thomas, with Sims, will always be foremost in the record of the world of gynecologists.

In looking through the volume before us, we are pleased to find numerous improvements. Many of the antiquated and inaccurate illustrations in prior editions, copied from other authors, have given place to new and original ones, and the text they are meant to elucidate is thus rendered much more intelligible. Many of the subjects have also been rewritten and elaborated, and in almost every chapter we find evidence of a careful revision of former editions.

The chapter which first arrests our attention, in glancing over them successively, is the one on Rupture of the Perineum. It is, in fact, almost a new one, and differs so materially from the one on the same subject in the previous editions, that we will stop for a short exposition of its merits.

In a careful and clear exposition of the anatomy of the perineum, which is rendered more intelligible by new outline illustrations, our author says:

“An imperfect idea is conveyed by the definition of the perineum, as a part consisting of the union of the tendons of a number of muscles effected at a point situated between the fourchette and anus. Should the superficial surface thus indicated be united by reparative operation, little good would result, for the sustaining powers of the perineum exist not in this, but in the thick and firm triangle called the perineal body, of which this muscular plane is the base, and the apex of which extends up to the point of divergence of the posterior vaginal and anterior rectal walls.”

This “perineal body,” our author shows, is that irregular triangle composed of fibro-elastic tissue and vessels formed by the divergence of the vagina and rectum at a point above the

perineum; the former passing forwards, in coincidence with the curve of the pelvis, and the latter backwards towards the coccyx. The base of this triangle is composed of the union of the perineal muscular tendons.

It is the restoration of this triangle, or so-called perineal body, that must be accomplished to insure a perfect result in cases of partial rupture of the perineum, as in partial rupture we only have to restore the strength and firmness of the vagina. It is evident, if such are the facts, that simple superficial closure of the perineum does not restore to the vagina or rectum their supporting body, and it is therefore a great gain to have an operation devised that accomplishes the restoration of the perineal body. Prof. Thomas describes this operation clearly and carefully, and he must be a dull operator who cannot fully comprehend all he essays to explain.

Complete rupture, involving as it does a laceration of the sphincter ani as well as the perineal body and rectum, has consequently been an evil difficult to remedy in a very satisfactory manner, and it is exceedingly satisfactory to find Prof. Thomas calling attention to a method which may almost be considered perfect, inasmuch as by it the continuity of the ruptured muscle is restored. As the author truly says, to no one are we so much indebted for the demonstration and practical results of the procedure as to Dr. T. Addis Emmet, one of his associates in the State Woman's Hospital.

The procedure referred to consists chiefly, after thorough denudation, in passing the first suture:

"By introduction of the needle as low down as the lower edge of the anus. From this point it passes upwards through the recto-vaginal septum, completely encircles the rectal vent and comes out alongside of the lower edge of the anus on the opposite side."

This suture, if thus introduced, must catch the ends of the ruptured muscle, and on being twisted must therefore necessarily bring the ends of the expanded muscle into close contact. It is this first suture our author insists which is the all-important one, the subsequent ones being passed as in cases of partial rupture.

Passing reluctantly over much that arrests our attention as deserving of note in the intermediate chapters, for the reason that the space allowed this review limits its extent, we stop to call attention to Nos. XIII., XIV., XV., and XVI., devoted respectively to the consideration of Acute Endometritis, Chronic Cervical Endometritis, Chronic Corporal Endometritis, and Chronic Metritis, or, as Professor Thomas aptly terms it, Areolar Hyperplasia. To say that these four chapters are among the best in

the book is true, and in saying that they comprise the most able exposition of the much mooted subject of uterine disease, is no exaggeration. Recognizing the error of many in following the dogmas and theories of inflammation, irritability, displacements, etc., as being the only cause of uterine disease, Professor Thomas has boldly freed himself from such tendencies, and calmly and dispassionately has sought to elucidate the truths that may be in each theory, reinforcing them by the unassailable facts of careful and extended clinical study, and the light of modern pathology.

That his views will meet with opposition from theorists and partisans, is undoubted; but it seems to us that Professor Thomas is so strong in his views, that he will rather court such opposition as more likely to prove his invulnerability than weaken his position.

The chapters devoted to the consideration of Uterine Displacements have also been much improved over former editions, and show throughout that our author has given much pains and attention to the study of their pathology and treatment, and as a result has introduced many new methods and instruments.

Uterine Tumors we also find have received careful attention, As a proof of how earnest and thorough a worker our author is, we find that he has himself been testing for some time the value of the subcutaneous injection of ergot to promote absorption of uterine fibroids, as advocated by Hildebrandt two years ago, and although he has not met with the same satisfactory results as the latter, yet his experience allows him to endorse it as promising excellent results.

The chapter on Diseases of the Ovaries is a most excellent one, leaving nothing to be desired, and giving much that is new and valuable, while the one on Ovarian Cysts and Cystomata, having been subjected to much alteration and the addition of considerable new material, constitutes almost a new chapter, or rather a treatise on the subjects of its heading. Professor Thomas is especially careful and lucid in treating of the subject of Diagnosis, and has omitted nothing that may in the least degree aid the young practitioner in diagnosing a case of ovarian tumor. A careful study of this chapter by our younger and less experienced gynecologists, will give us fewer reports of faulty diagnosis of, and consequently almost criminal operations for, supposed ovarian tumors, in place of which a pregnant uterus, subperitoneal uterine fibroid, etc., are revealed to the astonished operator.

Finally we come to the chapter on Ovariectomy, the last, but by far not the least, worthy of notice.

Authority to instruct in certain operations depends not so

much upon the frequency with which the instructor has performed them, as upon his skill and judgment, and sound knowledge of the subject he essays to handle. Though not having operated for ovariectomy oftener than some other well-known gynecologists, yet our author's results bespeak for him the right to be considered as careful, skilful and successful as many of his confrères who have long been recognized as masters of the operation.

Every variety and modification of the operation our author thoroughly describes, every step and detail in each receives full attention, and such approbation as from experience they deserve. The operation of Vaginal Ovariectomy Prof. Thomas thinks will, with experience, prove one of the advantageous methods of treating some ovarian cysts. He also thinks that Dr. Robert Batty's operation of removal of the ovaries for the immediate accomplishment of the menopause, and the cure of certain grave nervous disorders due to ovulation, "has a future before it which will be rich in good results." This operation he has performed once himself with good results. In treating the pedicle after abdominal ovariectomy, our author gives preference to the clamp, though he admits the great advantages of ligating in some cases. In regard to drainage after ovariectomy, Prof. Thomas is justly opposed to establishing it by the vagina, but claims great advantage in doing so through the abdominal wound in cases where there is the possibility of blood remaining or collecting in the peritoneal cavity. For this purpose he uses a slightly curved glass tube, about eight inches long, and half an inch in diameter, which he passes into Douglas's pouch. Through this the serum and blood drains, and in septicæmic cases by means of it the pelvic cavity may be washed out, as first recommended by Prof. E. R. Peaslee.

Reluctantly we are obliged to close this unsatisfactory notice of so excellent a work, and in conclusion would remark that as a teacher of gynecology, both didactic and clinical, Prof. Thomas has certainly taken the lead far ahead of his *confrères*, and as an author he certainly has met with unusual and merited success.

B. F. D.

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A quantity of Book Reviews having been crowded out of this number, will appear in the next.—ED.

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August to November.

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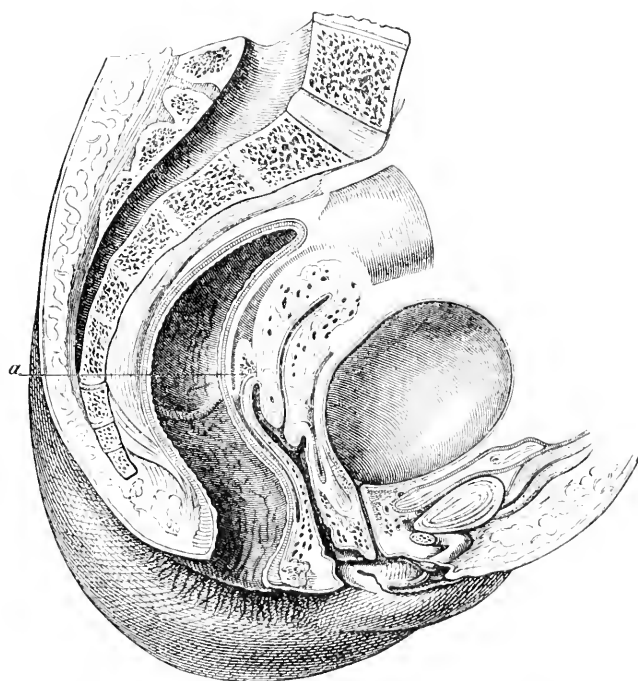
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COMMUNICATIONS have been received from: PROF. H. HILDEBRANDT, Königsberg, Prussia, on "Myo-Fibroid tumors of the uterus and their treatment by the hypodermic injection of ergot;" DRS. M. A. PALLER, New York, on "Vaginal cervioplasty, instead of amputation of the cervix in certain hypertrophic conditions of the uterus;" JAMES D. TRASK, Astoria, N. Y., on "Injections of tincture of iodine into the cavity of the uterus in post-partum hemorrhage;" W. A. FREUND, Breslau, Germany, and JAMES R. CHADWICK, Boston, on "Echinococci in the female pelvis;" MACKENZIE JOHNSON, Galveston, Texas, on "Retention of the ovum;" JOSEPH TABER JOHNSON, Washington, D. C., on "Peculiarities of parturition in the negro race;" R. W. TAYLOR, New York, on "Syphilitic lesions of the osseous system in infants and young children," conclusion. P. BRYNBERG PORTER, New York, on "Dactylitis syphilitica in infants."



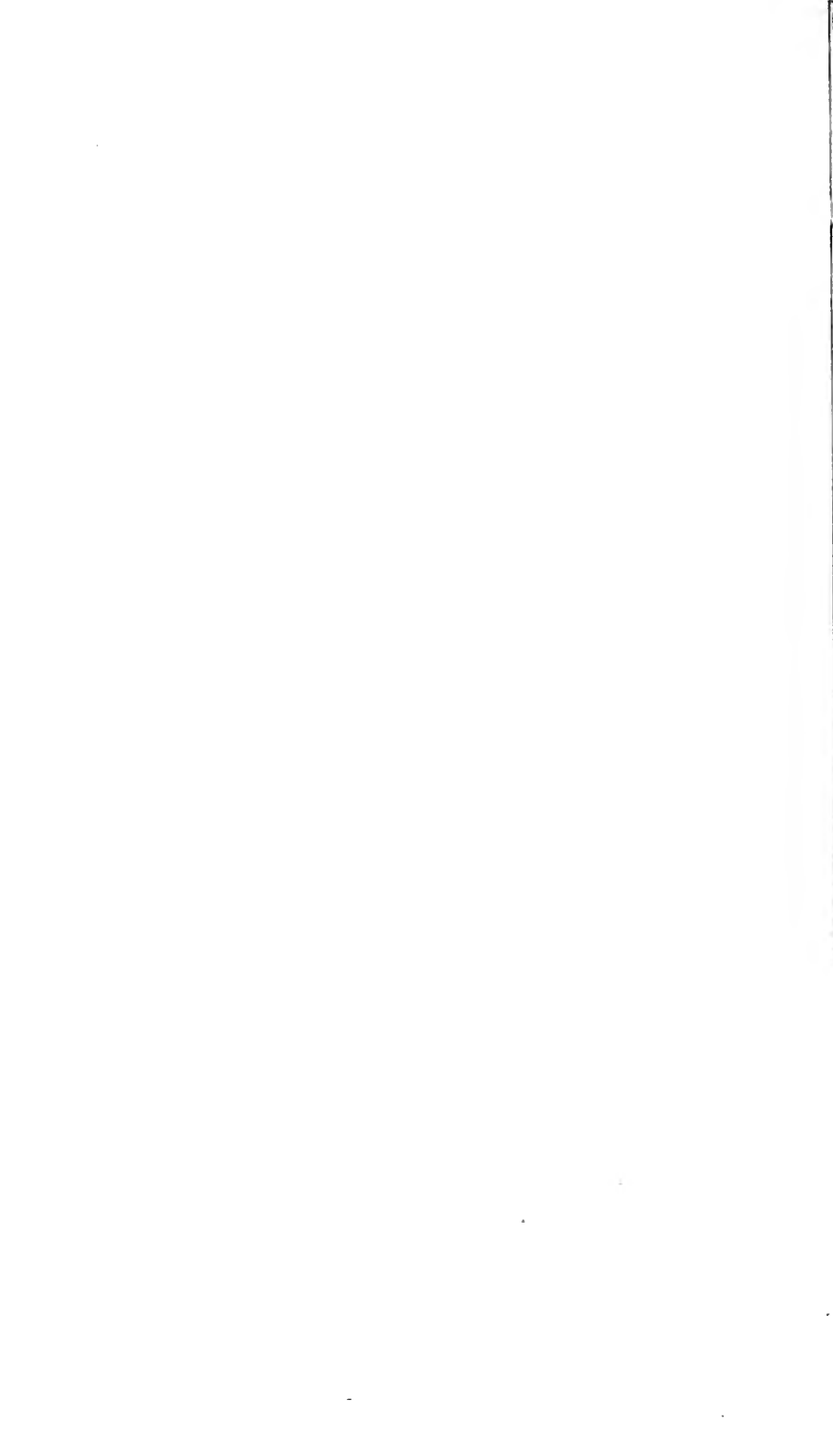
EXUDATIONS IN THE NEIGHBORHOOD OF THE FEMALE  
GENITAL CANAL, BY DR. SPIEGELBERG.

PLATE. I.



SAGITTAL MEDIAN SECTION THROUGH THE FEMALE PELVIS—LEFT HALF.  
THE RED LINE IS THE COURSE OF THE PERITONEUM.

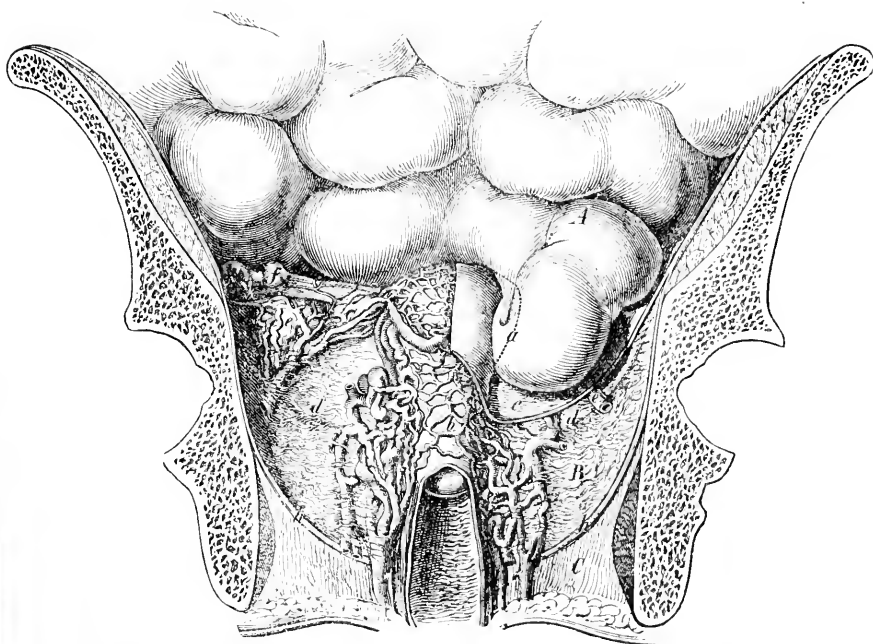
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# EXUDATIONS IN THE NEIGHBORHOOD OF THE FEMALE GENITAL CANAL.

BY DR. SPIEGELBERG.

## PLATE II.



POSTERIOR VIEW OF THE GENITAL CANAL AND ITS SURROUNDINGS.

*A.* Cav. pelv. peritoneale. *B.* C. p. subperit. *C.* C. p. subcutan. *a.* Outline of uterus. *b.* Parametran venous plexus, visible in the sub-peritoneal cellular tissue after removal of the posterior layer of the broad ligament (left entire, right partial). *c.* Remainder of the right posterior layer. *d.* The point of reflection of the anterior layer on the anterior abdominal wall seen through. *e.* Ovarian venous plexus. *f.* Left Fallopian tube. *g.* Iliacus muscle. *h.* Pelvic diaphragm.



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ORIGINAL COMMUNICATIONS.

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MYO-FIBROID TUMORS OF THE UTERUS AND THEIR TREAT-  
MENT BY THE HYPODERMIC INJECTION OF ERGOTINE.

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FIBROID and myoid tumors of the uterus are generally classed among the benign affections of that organ; and correctly so, because their pathologico-anatomical examination shows them to consist partly of normal connective tissue, which has no similarity whatever to that of malignant growths, and because the course of the trouble, even with a comparatively rapid increase of the neoplasm, does not necessarily exclude the attainment of a good old age, as is the case without exception in sarcoma and carcinoma. Whoever has had abundant experience in these cases, however, knows well that this disease, in the majority of instances, makes life a burden to the unfortunate beings afflicted with it, renders them confirmed invalids in at least one-third of the cases, and frequently hastens their death. The size and weight of the tumor, which bears and pushes downward during the erect position, and sooner or later also presses on the adjacent organs, the bladder, rectum, and pelvic nerves; the frequently returning profuse menstruation; the

<sup>1</sup> See "Preliminary Remarks" by Prof. Hildebrandt, p. 140, August Number, 1874.

intercurrent, enormous serous exudation; the general impossibility of conception, as well as the great dangers which may arise, when in exceptional instances uterine fibroids become complicated with pregnancy, leaving often no resort but Cæsarean section;—all these conditions destroy all pleasure in life to some women, others are rendered unhappy by their sterility, others again are incapacitated from work, and thus thrown into sorrow and misery, or brought to a premature grave by the excessive hemorrhage. The disease is, besides, much more serious than other so-called benign tumors, because the means which we are justified in employing for its removal are limited in number, and especially very doubtful in their action, and extremely dangerous in their employment. There are here two indications for therapeutic interference: either to remove the tumors themselves, or, in case of failure, at least to cause the disappearance or alleviation of the symptoms. Symptomatic treatment, however, is of very little avail; the metrorrhagia can be rapidly and permanently arrested neither by ice-compresses or ice-water injections into the vagina, nor by the once so highly lauded injections of perchloride of iron into the uterine cavity, all of which are very inadequate and unreliable palliative measures. Radical operations have been but little more favorable in their final results. The waters of Kreuznach have the reputation of dispersing fibrous tumors of the uterus; if the histories of the respective cases are, however, examined, the supposition involuntarily forces itself on the mind that, in the cases reported as cured, plastic exudations were mistaken for fibroid tumors, and that the former, even though they be very extensive and of long duration, do disappear in Kreuznach, is a well-established fact. The only tolerably favorable results have been obtained by the operative enucleation of the tumors. But the disastrous termination of the first operations of this kind, performed by Amussat in 1840, with one fatal result in three operations, and Hutchinson, who, in a statistical report of eighteen complete and six incomplete enucleations, published in 1857, mentions one-third of the cases as having ended fatally,<sup>1</sup> has restricted the operators within very narrow limits, to tumors of very moderate size and low, easily attainable site,

<sup>1</sup> See Hegar and Kaltenbach, "Die Operative Gynäkologie," Erlangen, 1874.

and to those cases in which the hemorrhage is so profuse as to render the always dangerous operation of enucleation preferable to, and no more perilous than, the continuance of the symptom which it is intended to relieve. I know of but one operative measure which is safe, easy of execution, and in many cases capable of moderating or entirely removing for some time the gravest symptom of uterine fibroids, the profuse metrorrhagia, and that is the lateral division of the cervix as far as the internal os. The relief of tension which these incisions cause in the ectatic vessels, particularly of the capsule, appears to be the reason of this temporary improvement; a cure and removal of the tumor by these means has, of course, not been achieved.

A remedy, therefore, which, after the uncertain success of internal and operative measures, arrests the symptoms in the majority of cases, and thereby restores to the patients strength, comparative health, and the ability to work, which in many cases has materially reduced the size of the tumors, in some even caused their entire disappearance, such a remedy must necessarily be hailed as a great blessing.

If I think I have found so beneficent a remedy in the hypodermic injection of ergotine into the abdominal parietes in the neighborhood of the tumor, I have still never been so hopeful and sanguine beyond all medical reason and common sense, as to expect to remove *every* fibro-myoma of the uterus by this method. I have always thought that the happy result in one case in which, after hypodermic injections of ergotine, a tumor, which reached up to the umbilicus, entirely disappeared after a few months, and the woman was safely confined a year thereafter, might possibly be repeated in some cases, but would by no means follow in the majority, that, perhaps, frequently the symptoms might be relieved by this remedy; but that there would doubtless be many cases, particularly of old, firm tumors in old persons, on which this treatment would exert no influence whatever. Fortunately, these very firm, hard, old tumors in old women usually give the least trouble and need the least active treatment. In the beginning, however, when I was obliged to test my method carefully, I injected ergotine hypodermically in every case of uterine fibroid which came under my notice, and therefore think that this very abundant material has enabled me to ascertain various points of value in the prog-

nosis as to whether a case is likely to be benefited by the treatment in question or not. Perhaps further careful observations may succeed in making the prognosis still more decided.

#### EXECUTION OF THE METHOD.

I first employed only those mixtures for hypodermic injection which I have named in my first paper (Berl. klin. Wochenschrift, Nov. 25, 1872), viz., extr. secal. cornut. aq., 3.0 with glycerine, 7.5, and aqua destillata, 7.5. Subsequently I added a quantity of ext. hyoscyami to this mixture in order to diminish the pain of the injections, but with little benefit. The injection was less painful if I omitted the glycerine, and used simply a solution of ext. secal. cornut. aq., 3.0 in distilled water, 15.0, or if the amount of glycerine was merely diminished (ext. secal. 3.0 in aq. dest., 13.0, and glycerine, 2.0). Of late I have been in the habit of using the ext. secal. aq., prepared in Berlin according to Dr. Wernich's formula (Berlin. Beitr. z. Geburtshilfe und Gynäkologie, Bd. III., 3, p. 71), to the solution of which in the above proportions I also add a small amount of glycerine, because without it in a few days fungi develop themselves, which are evidently very liable to increase the pain of the injections, and generally destroy the efficacy of the preparation.<sup>1</sup> With *very few* exceptions, I always

<sup>1</sup> NOTE.—The preparation of Wernich's extract of ergot is described by him (loc. cit., p. 112), substantially as follows: A certain quantity of the ordinary aqueous extract of the German Pharmacopœia is placed in a percolator with a bottom of parchment paper; in from four to six hours the distilled water in the vessel beneath begins to assume a brownish color, and to acquire the active principle of the ergot, but a small amount of which remains in the original extract. The new solution is then evaporated down to a dry mass, which is very soluble in water and contains all the active parts of the drug. To this mass is added a small quantity of dilute sulphuric acid, and the whole then treated with alcohol; this solution is carefully evaporated and neutralized with bicarbonate of soda, thus showing the active principle to be an acid contained in the alcoholic extract. If strong alcohol be now added to this solution a precipitate is formed which is of a light-brown color, easily soluble in water, making a quite clear solution, and may be preserved without difficulty for months. This is the chemically pure aqueous extract of ergot, freed from all impurities, glutinous principles, phosphate of lime and potash, which have been removed by treating the ordinary aqueous extract with alcohol, which process requires to be repeated as often as three times before the above-mentioned impurities, which render the hypodermic injection painful,



inject the contents of a *full* Pravaz's syringe. The syringe used by me contains 44 drops of a solution of  $\mathcal{R}$ . extr. secal. cornut. aq. Wernich 3.0 in aq. destill. 12.0 and glycerini puri 3.0. The drops were formed by pressing the fluid slowly out of the syringe, which was armed with the needle and held horizontally, the solution being dropped from the tip of the needle. A fresh specimen of the above solution, 18 grammes in quantity (about 3 v.), contained 22 such syringefuls; 7 syringes therefore contain about 1 gramme, one syringe  $\frac{1}{7}$  gramme, which amounts to about 2 grains of the extract (a little more, about  $2\frac{1}{8}$  grains). Among the cases described by me there are only two in which the intense pain caused by the operation and the extreme sensitiveness of the patient (not the fear of cellulitis and suppuration) induced me to inject only  $\frac{1}{2}$  or  $\frac{3}{4}$  of a syringe-ful.

#### THE PAIN ATTENDING THE INJECTIONS.

Every patient experiences some pain from the hypodermic injection of the above-mentioned solution of the aqueous extract of ergot, but I have never found it sufficiently severe to induce me to give up the method. In one case only, in a very nervous, debilitated lady, was I obliged to cease the treatment after the fifteenth injection, because the patient, although she distinctly perceived the favorable influence of the ergot in the

are removed. By Wernich's method a perfectly pure aqueous extract of ergot is obtained in the proportion of 13.5 to 14.5 per cent. of the original quantity of powdered ergot. Up to the time of the publication of his paper, Wernich had made repeated hypodermic injections with his preparation in three patients, in two others they had been made by a friend, and Wernich had injected himself a number of times; in all these instances the injection was absolutely painless, no abscesses ensued, and even the slight cutaneous cellulitis produced by the injection disappeared in less than twenty-four hours in his own case, in his three patients, who were injected in the abdomen and thigh, in still less time. W. says that his preparation leaves no trace in the tissues after from twelve to twenty-four hours.—We are not acquainted with the method of preparation of Squibb's new solid aqueous extract of ergot, which is also soluble in water, free from all irritant matter, and six times the strength of pure ergot, and is rapidly becoming known and appreciated, but should imagine that Wernich's extract must be quite similar to or even identical with it, and that all the results obtained with Wernich's must be equally attainable with Squibb's preparation.

ED. and TRANSLATOR.

regulation of her menstruation, which for many years had been irregular and profuse, still did not possess the courage to bear the pain which occasionally brought on hysterical paroxysms. As a rule the pain has never been an impediment to the treatment, not even in women who had become very nervous and much debilitated by long-continued metrorrhagia, although at times I was obliged to use persuasion to induce the patient to persevere in the treatment; this was very seldom necessary, however. The pain produced by the injection varies greatly according to the sensitiveness and debility of the individual, and has very different causes. First, the insertion of the needle is painful as well as the mechanical distension produced by the fluid penetrating into and pushing aside the layers of tissue. This painful sensation, of course, can be no more severe than when any other fluid is injected under the skin. A second source of pain is the chemical irritation caused by the foreign body injected. But I have found this irritation much diminished since I have been using the solution of Wer-nich's extract of ergot with a small quantity of glycerine. The third and principal cause of pain are the uterine contractions following the hypodermic injections. On an average two to three hours elapse after the injection, the pain of the puncture and of the chemical irritation has long passed away, when very violent uterine contractions set in, which radiate to the inguinal regions, and even down the thighs. They do not appear in all patients, and in some are very slight, but when they do come on they are not to be looked upon as an obstacle to the hypodermic treatment, but rather as a decidedly favorable symptom for the cure, for the energetic, finally tetanic contractions of the uterus are to be considered alone as the principal curative agent; without them we need neither expect the cessation of the symptoms nor the total disappearance of the tumor. It is easy to see that the pain, which comes on two or three hours after the injection, frequently with great intensity, is really caused by uterine contractions, and not by inflammatory irritation, because it is always compared to the labor-pains, and is more severe in uteri with large cavities and intact muscular tissue, that is, when the uterus is in a condition similar to that of the puerperal state (in which state ergot is well known to produce tetanus of the uterus most readily); whereas with a

short cavity, or walls stretched and thinned, or rigid with exudative infiltration, this secondary pain is wont to be much lighter. As a rule, the first three injections are found to be the most painful, and the succeeding ones gradually less and less so, a circumstance which we must not omit to mention to the patient as a consolation and an inducement to persevere in the treatment. Some parts of the abdomen are less sensitive to the injections than others; they are best borne in the vicinity of the umbilicus, and most painful in the inguinal regions. It also makes a great deal of difference whether the patient remain quiet in the recumbent position or walk about after the injection. A number of patients, upon whom I performed the operation in my office, experienced excessive pain on the way home, especially those who were obliged to walk some distance. When the injections were given the same persons at home, where they could maintain the recumbent position for several hours afterward, they bore the treatment very well and suffered but little.

INFLAMMATION AND ABSCESES OF THE SKIN AT THE POINT OF  
INJECTION.

My method of the hypodermic administration of ergotine has been reproached with causing, in addition to severe pain, almost invariably (some say only "very often") abscesses of the abdominal wall at the point of injection. This occurrence, if it really did take place regularly, would naturally be not only an obstacle to the method itself, but would even make it entirely impracticable; indeed, many physicians after the first trial, have been deterred thereby from further employing the method. I have never had any such unpleasant experience. I am sure I do not exaggerate when I say, that up to the present time I have myself made, at least, one thousand hypodermic injections of ergotine for various purposes (innumerable times for post-partum hemorrhage), or have seen them made, and observed their results in the clinical wards in charge of my assistants. For instance, up to date 195 injections have been administered by me personally to a lady with a very large fibroid. I have never seen an abscess follow the injection made by me personally, and only in three clinical cases did this accident occur.

Two of these patients appeared unusually sensitive to the agent; in the third, the injection, as the assistant who performed it reports, was made too superficially, because the patient shrank back at the moment of injection, and caused the needle almost to slip out of the skin. The chief reason why no abscesses formed among the large number of other injections, entirely contrary to the accounts of other operators, lies in the circumstance that I always injected the fluid very deep into the subcutaneous cellular tissue—perhaps even into the abdominal muscles. If the skin of the abdomen is lifted up in a tolerably high fold by the thumb and forefinger of the left hand, the needle introduced perpendicularly up to two-thirds of its length into the apex of the fold, and the fluid then injected, no abscess will ensue. If the injection, however, is made timidly and superficially, a very painful and diffused cutaneous abscess will usually arise. That this precaution, to inject deeply, is alone sufficient to prevent suppuration, has been of late energetically emphasized by Prof. von Langenbeck, in a session of the Berlin Medical Society.

#### TOXICAL SYMPTOMS.

Some patients seem to have a very marked idiosyncrasy against ergot, although such cases appear to be rare. I have met with it only once, in a lady who already, after the sixth injection, complained of vertigo, defective control of her lower extremities, and slight spasms of the flexor muscles of the forearms. These symptoms entirely disappeared within two days after the last injection. The treatment, however, had to be discontinued after two more trials on account of the return of the toxical symptoms. With this exception, in but four cases after 30, 50, 60—in one case not until after 195—injections, have I seen the above-mentioned symptoms of toxæmia come on. In these four cases, however, after an intermission of a fortnight, during which time the patient took daily warm baths, it was possible to recommence and regularly continue the injections. Of late a case has been reported in which acute, dangerous toxæmia was induced. In the Medical Society of Prague, Dr. Kleinwächter reported a case in which, after the tenth injection, the patient presented symptoms similar to those

of poisoning by morphine: deep coma, low temperature, intermittent pulse. Dr. Kleinwächter, however, injected a very strong solution, viz.: 3 parts of ergotine to 2 each of water and glycerine. Had he used the solution hitherto always employed and described by me, the proportions of which are 3:15, he would certainly not have produced such a toxical effect.

## CURATIVE RESULTS.

I think I have proved in the foregoing pages that the reproaches made by many physicians against the hypodermic administration of ergotine, that it is too painful, that it generally produces abscesses, and often toxical symptoms, are, for the most part, unjustifiable, excepting only a certain degree of pain accompanying any hypodermic injection, which, with a proper solution and the observance of rest after the injection, gradually diminishes in the course of the treatment.

The greatest reproach from which I have to clear myself is, however, that made by several physicians who claim to have given the procedure a fair trial, viz.: the reproach that the method is entirely ineffective both in removing the symptoms and in causing the disappearance of uterine fibroids. The most severe judgment of this kind has been pronounced by Prof. Martin, sen., of Berlin; for in the Transactions of the Berlin Obstetrical Society, vol III., No. 1, p. 10, I find the following passage: "When Prof. Martin was still a member of the Obstetrical Society, he allowed no opportunity to pass, to say, that in so-and-so many cases of myo-fibroid tumors he had never seen the least benefit from injections of ergotine." I have already stated above that I am not so entirely bereft of the power of medical reasoning as to believe that all uterine fibroids can be removed by ergotine injections. If Prof. Martin, therefore, has never witnessed any benefit therefrom, it is very probable that he accidentally chose for his experiments only old, indurated, anæmic fibroids, or such as we shall hereafter show to be inaccessible by their situation; he gives no account whatever of his choice of cases. On the other hand, I am able to prove that Dr. Bengelsdorf (Berlin. klin. Wochenschr., 1874, No. 2), another author, who likewise reports a negative result from the ergotine injections made by him, chose cases for treatment in

which, according to our pathologico-anatomical views, a reduction or absorption of the tumors was physically impossible. They were cases of old women whose fibroids had become dense, almost cartilaginous, and partly calcified from age, and, of course, were unchangeable, and remained unchanged.

In opposition to these negative results there are but very few favorable reports to be found in literature; Dr. Keating, in the Transactions of the Philadelphia College of Physicians, July, 1873, describes a case of submucous fibroid of the uterus, which had diminished to one-third of its size after sixteen injections. In the Proceedings of the Obstetrical Society of Leipzig, Dr. Hennig (*vide Archiv für Gynäkologie*, Vol. V., No. 1, p. 169) reports the case of a myoma of the right uterine wall which diminished in size from week to week in consequence of the hypodermic administration of the aqueous extract of ergot. Dr. Wernich, in his paper on a new preparation of ergot (*Berliner Beiträge zur Geburtshilfe u. Gynäkologie*, Vol. III., No. 1, p. 77, seq.), says on page 128 of this paper, that in the cases of fibromyomata of the uterus, in which he administered the hypodermic ergotine injections solely with a hæmostatic object, five or six injections already produced a decided result. Besides these few favorable opinions in literature, only two other private communications on the subject from friends of mine have reached me. Professor von Scanzoni, in Würzburg, had the kindness to write me, under the date of March 30th last, that since May, 1873, he had treated uterine fibroids with the hypodermic injection of ergotine, and that in seventeen patients with fibroids of various sizes, he had continued them persistently for a number of months, and, on the whole, with very satisfactory results, although a complete cure was not obtained in any case. One tumor, for instance, which extended to midway between the umbilicus and symphysis pubis, diminished to the size of a medium-sized orange, after about forty injections. In a second case the tumor, which was as large as a fist, shrank to the size of a goose-egg. In a third case of a fibroid of the size of a child's head, in which the profuse hemorrhage had reduced the patient to an excessively anæmic condition, the flooding ceased for good after the seventh injection, and the menses became less copious, lasted only five days (instead of eight or ten days, as formerly), and the tumor, after

fifty-one injections, has decreased to about the size of an orange.

Another private communication of a very favorable result has been sent me by my colleague, Dr. Burow, of Königsberg. A lady, 47 years of age, had been suffering for ten years from profuse menstruation, until finally, in the beginning of the year 1874, the constant drain had reduced her to an extremely anæmic condition; her complexion had become greenish and her limbs œdematous. The metrorrhagia was caused by a fibroid tumor of the uterus of the size of a child's head, equally palpable from the abdomen, the vagina, and the rectum. The vaginal portion had become almost effaced by the distention of the uterus through the neoplasm. From January 20th to April 1st, 1874, with few omissions, hypodermic injections of ergotine were made daily. The general effect, as well as the local on the uterine tumor, was decidedly favorable, even surprising to the attending physician. At an examination on the 20th of March, the tumor was found to be so much reduced, that the uterus was but little larger than normal, about the size of an orange, and the vaginal portion had regained its natural shape; the serous discharges during the intermenstrual period had ceased. March 31st, the menses reappeared in a normal manner after a pause of four weeks. The general health is now admirable, the complexion rosy, and the mucous membranes are of a natural color; the œdema has entirely disappeared. All anæmic symptoms have vanished, the depression of spirits has given place to a bright and lively temperament.

Before passing to the cases which I have treated myself, or to which I have been called as consulting physician, I will briefly refer to the first case published in the first series of my observations (*Berliner kl. Wochenschrift*, 1872, No. 25). It is the case of a soft intramural myoma, which had distended the uterus to such an extent as to cause it to resemble a gravid uterus in the twenty-seventh or twenty-eighth week; the case in which all the usual remedies had been persistently employed for months previously without success, and in which, after three months of ergotine injections, the tumor had completely disappeared, and the uterus had regained its normal dimensions. Two years after the close of the treatment, this patient, after passing through a normal pregnancy and confinement, returned to

Königsberg from Central Russia, and presented herself with her healthy child, in order to thank me again for her cure. I did not neglect to make a thorough examination of her genital organs, and found the uterus small, and the surrounding pelvic organs absolutely free from disease. As regards case V. of my first series, in which likewise a large fibro-myoma of decidedly firmer texture, and moreover in a much older subject than in the preceding case, had enlarged the uterus to the size of the twenty-eighth week of gestation, I can confirm a lasting improvement. All troublesome symptoms have disappeared: both the hemorrhage and the serous discharges, as well as the constant dragging and straining pains in the abdomen, especially severe in this case, and the manifold derangement of digestion. A still greater reduction of the tumor, it is true, did not take place. The other cases in that report have not presented any changes worthy of note since that time.

#### NEW CASES OBSERVED BY ME.

The new cases observed by me since the publication of my first paper on this subject, two years ago, are here reported in three classes, for the sake of a clearer survey, accordingly as a complete or nearly complete success was obtained, or the symptoms only were relieved, or third, no improvement whatever resulted from the injections.

#### I. CASES WITH REMOVAL OF THE SYMPTOMS AND DIMINUTION OF THE SIZE OF THE UTERUS.

1. Mrs. F., from M., 43 years of age, mother of three children, had been troubled with severe abdominal pain during menstruation for several years, the flow continuing a fortnight. August 3d, 1870, I saw the patient for the first time, and found her condition as follows: Uterus somewhat enlarged, indurated, the right side near the broad ligament slightly protruding. Notwithstanding the persistent use of strong mother-lye baths and iodine mineral waters (Adelheid Spring) the patient grew worse from month to month, and her abdomen became heavy, and perceptibly and permanently larger. I did not see the patient again until May 21st, 1872, when I found the whole body of the uterus pushed towards the left side, its walls somewhat



thickened and elastic, and the slight protrusion of the right side of two years previously changed to an elliptical soft fibroid, reaching as high as the umbilicus. The sound passed into the uterus to double its normal length. From May 22d to Aug. 1st, 1872, about 50 injections were made at my office. No cellulitis, no abscess. At the close of this treatment the condition was as follows: Vaginal portion slender, soft, body of the uterus about the size of the third month of pregnancy, spherical, uniformly enlarged. The cavity of the uterus measures 3'' with the sound.

2. Mrs. R., from St. Petersburg, 34 years of age, suffering for five years from menorrhagia, sterile, long under the treatment of Prof. Carl Braun, in Vienna, for fibroids of the uterus. Condition June 5th, 1873: In the right uterine wall a tolerably firm fibroid of the size of a man's fist; besides, three smaller subperitoneal fibroids of the same consistence, about as large as hazel-nuts. Menstruation was very profuse, returning every fortnight, and lasting a week; by advice of Carl Braun, the flow had been arrested after the second or third day by tightly tamponing the vagina. Of the 55 injections made, notwithstanding the great sensitiveness and irritability of the patient, none were followed by cellulitis or abscess. On examination, Sept. 1st, I found the following condition: The large intramural fibroid had disappeared, the smaller subperitoneal tumors had remained the same in size, but had become much more distinct, owing to their having become more separated from the surface of the uterine tissue. Menstruation returned at regular intervals, but was still more profuse than normal. The tampon, however, was no longer required.

3. Miss G., from Königsberg, 28 years old, came to me for treatment, October 9th, 1873. Her menstrual flow had been rather abundant before, although returning at regular intervals; but since May, 1873, it appeared every 10 days or fortnight, and lasted a week, without pain. The hemorrhage had evidently very much weakened the patient. Her complexion was of a pale-gray color, and her general health was very poor. I found a tumor deep in the abdomen, which could be traced almost up to the umbilicus; it was connected with the uterus, from which it could not be distinguished, and with which it could be moved from side to side. The surface of the tumor had a

glandular feel, its consistence was elastic, and its seat must have been in the posterior wall of the uterus, which was much anteverted. Up to December 3d, 1873, 26 injections were made without producing cellulitis or abscess. On the above day the apex of the tumor stood close above the symphysis pubis; the general health had improved rapidly, her complexion had become natural, her strength had returned, the last menstruation had been normal in time and character. The patient felt so well, that she desired to discontinue the treatment, which took up too much of her time every day.

4. Mrs. Rose Josetith, from Russia, thirty-seven years of age, mother of five children. Clinical case. After the birth of the last child—seven years ago—which she had nursed for two years, her menstruation had always appeared too soon, had been very profuse for seven to ten days, and was accompanied by violent colicky pains, and the expulsion of large coagula. In consequence of this hemorrhage the patient became very much emaciated and feeble; her complexion was unhealthy, pale, and wrinkled. The uterus stood lower in the pelvis than normal, and was anteverted; its body was as large as a medium-sized apple; the sound could be introduced to the depth of  $3\frac{1}{2}$  inches. From March 1st to May 27th, 1874, 62 injections were made, and the uterus was then found to be of about the normal size, as in women who have borne several children; the sound enters only to the depth of  $2\frac{3}{4}$  inches.

5. Mrs. von. A., from Königsberg, thirty-six years of age, sterile after fourteen years of married life. The patient suffered from very profuse menorrhagia, lasting five days, returning every eighteenth to twenty-first day, accompanied by violent hemicrania, and followed by great weakness. The entire uterus was enlarged and indurated. In its right wall was a tumor as large as an orange, which I took to be a fibroid. This lady received fifty-five injections at intervals of two or three days, and frequently but of half a syringe-ful, because her nervous and irritable condition made her more susceptible to the pain of the injections than the other patient. At the close of the treatment, the tumor had disappeared, the cervix uteri, which had previously been short and stumpy, had become slender and elongated, the uterus itself had not diminished much in size, but had become softer, and the hitherto very narrow external os

had dilated to the normal size. The menses returned regularly for the first time in many years, were accompanied by very slight hemicrania only, but were still too profuse. In this case I am not quite certain as to the diagnosis. It is possible that the tumor was no fibroid, but a parametritic exudation (cellulitis) between the folds of the right broad ligament, although its long duration, its smooth, round surface, and its moderate firmness do not speak for the latter condition.

6. Mrs. K., carpenter's wife, thirty-six years of age, mother of five children, came under treatment in the Out-door Department, June 15, 1873, for a fibroid of the size of an orange, situated at the left posterior portion of the body of the uterus, which caused very profuse hemorrhage, returning every three weeks, on the second or third day of which large coagula were generally expelled. After forty injections the tumor was reduced one-third. The menses returned unchanged once only after the commencement of the treatment; the succeeding period already was normal in interval, duration and amount. September 12, 1873, I was obliged to stop the injections, because the menses had entirely ceased, and October 12th, pregnancy was definitely diagnosticated. During this pregnancy the tumor increased materially in size, and its surroundings were frequently very painful, but no hemorrhage took place. Premature delivery at eight months occurred; the feeble infant died after a few days. Six weeks after delivery and a perfectly normal convalescence, an exceedingly profuse and protracted menstruation came on, which enfeebled the patient so much as to cause her to seek admission to the clinical wards. On admission, May, 8th, 1874, by palpation of the abdomen a tumor of the size of a man's head was discovered in the median line, which tumor was round in shape, elastic in texture, with a smooth surface, without fluctuation, and movable in the pelvis. It was similar in size, shape, and consistence to a gravid uterus of the twenty-eighth or thirtieth week. The circumference of the abdomen measured (1" below umbilicus) thirty inches, the distance between the symphysis and the umbilicus was 7", the apex of the tumor extended  $1\frac{1}{2}$ " above the umbilicus, the length of the cavity of the uterus measured by the sound 6". On examination per vaginam the lower border of the tumor was felt to extend in the posterior laquear vaginae down to the

supra-vaginal portion of the cervix. Up to August 30th, 1874, fifty injections were made. The patient now looks strong, has recovered her health, and is able to attend to her household duties. The menses have appeared in a normal manner. The greatest circumference of the abdomen is  $1\frac{3}{4}$ " below the umbilicus, and measures 28", the distance between the symphysis and umbilicus 6", the apex of the tumor  $\frac{3}{4}$ " below the umbilicus. The sound enters  $4\frac{1}{2}$ ". The tumor can no longer be felt in the posterior laquear vaginae.

II.—CASES IN WHICH BUT LITTLE WAS ACCOMPLISHED AS REGARDS THE DIMINUTION OF THE TUMOR, BUT IN WHICH A MATERIAL IMPROVEMENT OF THE SYMPTOMS TOOK PLACE; PARTLY COLLECTED FROM MY OWN CASES, PARTLY COMMUNICATED BY OTHERS.

1. Mrs. M. Boehl, glazier's wife, from Friedland, thirty-three years of age, sterile after several years of marriage, afflicted with menorrhagia since her twenty-fourth year, accompanied by the exceedingly painful discharge of large coagula. An examination, May 18th, 1874, showed an anteverted uterus of double the normal size, so very painful to the touch as to prevent reposition. Its anterior wall was exceedingly thick and nodular, and as hard as wood, as was also the cervix; the external os was very narrow. I considered the presence of a fibroid of about the size of a hazel-nut in the anterior wall to be the cause of the chronic areolar hyperplasia of the whole uterus and the tendency to profuse hemorrhage. First of all, leeches were several times applied to the cervix, iodide of potassium was given internally, sitz-baths of the temperature of  $30^{\circ}$  R., with an addition of Kreuznach mother-lye, were taken, and later the warm ascending vaginal douche was used. June 24th, the uterus was no longer sensitive to the touch, and the cervix had become softened. The injections were now begun and continued till July 30th. A deep incision of the cervix was made during this time. In all, thirty injections were made. The results of the treatment were found to be as follows on July 30th: The patient looks healthy and well. The uterus is of normal length and consistence; menstruation has appeared in a natural way. Of the most importance and most satisfactory

to me was the following result: The supposed fibroid in the anterior uterine wall had evidently been pressed forward out of the surrounding muscular tissue, and could be distinctly felt with the finger as a round subperitoneal tumor of the size of a hazel-nut. The uterus had probably been pushed backward by this tumor, and, in place of the former marked anteversion, now occupied its normal position. This result appears to warrant the hope that conception may ensue, since the deviation of the uterus has been remedied, and the cervix made patulous by incision, and the previously existing obvious causes of sterility have thus been removed.

2. Mrs. A. G., polyclinical patient since August 26th, 1874; sterile after several years of married life; very much enfeebled by profuse menstruation during the last  $2\frac{1}{2}$  years. The fundus extended 3" above the symphysis, the enlargement of the organ being caused by a large fibroid in the right wall, which projected into the cavity of the uterus, and had a firm texture and a smooth surface. Up to November, 1873, sixty injections were made. Since then the menses are perfectly normal, and the patient, who formerly was obliged to keep her bed at those times, is now able to walk about, as usual, during the flow. The size of the uterus and the tumor has, however, diminished but little; its apex still reaches a little above the symphysis pubis.

3. Mrs. H., from M., sterile in twenty years of married life. Menses every 28 days, lasting 6 to 10 days; during 48 hours very copious, accompanied by the expulsion of large coagula, afterwards great debility, with paroxysms of dyspnoea and hysterical weeping. Uterus as large as in the fourth month of pregnancy; anteflexed. At the left side of the fundus a subperitoneal fibroid. The corpus uteri was expanded to such a regular round shape, and was so elastic as to leave me no other diagnosis but that of an intrauterine fibro-myoid tumor. After fifteen injections, made at intervals of two days, the menses appeared in a normal manner. The patient, who had become very nervous and debilitated by the steady drain on her system, however, then decided to stop the injections, because they were too painful.

4. Mrs. S., from Charkow, 37 years of age, once confined in her seventeenth year, since then without children, was treated

by me in conjunction with my friend Dr. Seydel. Menstruation was regular in interval and painless, but very profuse and debilitating. Two tumors were distinguishable in the uterus: one subperitoneal, of the size of a small apple, in the left side of the uterus; a second, somewhat larger one, intramural in the posterior wall. Both from their round shape, sharp boundary, and elastic consistence, were considered to be fibro-myoids. From May 17th to June 16th, 1873, the injections, with one intermission of four days, were made daily in the usual manner. The next menstruation was two days shorter, and much less profuse than usual. Both tumors had diminished a little, but distinctly in size, and their boundaries could be still more clearly defined. The patient was then obliged, by circumstances beyond her control, to return to her home.

5. Mrs. S., 35 years of age, clinical case, admitted November 3d, 1874. For over two years menorrhagia, lasting eight days, frequently returning in eighteen, and even eight days; of late so profuse as to cause syncope. Large fibro-myoid tumor of the anterior wall of the uterus; the fundus uteri projects above the symphysis pubis, like a gravid uterus at the fifth month, and the tumor reaches deep into the pelvis, in shape and size like a child's head. High up, posteriorly, the os uteri could be felt as a small, narrow, transverse fissure. From November 3d, 1873, to January 31st, 1874, forty-seven injections were made, after which the tumor was found to be little changed, perhaps somewhat smaller. The menses, however, appeared first at intervals of 14, then of 22 and 21 days; were still rather more copious than normal, but much less in quantity, and shorter in duration than formerly, and did not affect the general health. January 31st, the patient was obliged to return to her home.

6. Miss F., from L., came under my treatment May 1st, 1872. For six years menstruation had been very profuse and painful, continuing eight to nine days, and returning every sixteen days. The general health of the patient was very poor, her complexion of a cadaveric hue. The uterus was ante-flexed, broad, reaching slightly above the symphysis pubis, firm in texture, with a smooth surface. A distinct tumor could not be detected. The uterus was too large for a mere areolar hyperplasia. The symptoms corresponded to those of a neoplasm. From September 1st to October 25th twenty-two in-

jections were made. The general health had much improved during this time; the menses appeared after a pause of twenty-nine days, lasted only seven days, and were copious only during one night. From October 25th the injections were continued by Dr. P., in L., with good effects as regards the menorrhagia, but without diminishing the size of the tumor. During the past winter, however, the hemorrhage again increased, notwithstanding the injections. An examination a few weeks ago revealed to me that the tumor is advancing downward. The vaginal portion of the cervix has almost disappeared in consequence of the deep site of the tumor; the anterior lacunar vaginae is filled by the projecting anterior wall of the uterus. I hope that the evidently submucous fibroid will develop into a polypus, which sooner or later will be ready for operation. This migration of the tumor doubtless caused the increased flooding during the winter.

7. Miss S., 47 years of age, treated by Dr. S. in Königsberg. Uterine fibroid of the size of an adult head. Menses very profuse, followed by copious leucorrhœa, 12 injections; next menstruation moderate, two days shorter than the preceding one; leucorrhœa and tumor unchanged.

8. Mrs. F. S., 35 years; clinical case; during the last nine months very profuse menstruation lasting eight to ten days, returning at intervals of three weeks; on admission, March 4th, 1874, the fundus uteri midway between the symphysis pubis and the umbilicus, round, tensely elastic; the cervix open as far as the internal os; 25 injections. Next menstruation lasted from March 10th to 19th, much less profuse than usual. Discharged April 3d. General health good, no complaint, uterus 2" above symphysis pubis.

9. Mrs. M. from M., 38 years of age; clinical case. Admitted May 6th, 1873. Profuse flooding for the last seven years; during past two years menorrhagia at intervals of a fortnight, with a continual discharge of sero-sanguineous fluid. After 14 injections, for the first time the menses were normal, lasted three days; after an interval of thirty-one days entirely free from any discharge. General health good.—This is one of the clinical cases in which, notwithstanding the usual precautions, cellulitis and abscesses twice resulted from the injections.

10. Mrs. P., 34 years of age, treated in the Out-door Depart-

ment since June 15, 1873. Since one year the menses, which formerly appeared regularly every 4 weeks, came on every 3 weeks, were very profuse, and large coagula were expelled. In the left wall of the uterus a fibroid of the size of a child's fist; 40 injections, after which the fibroid was found to be diminished one-third; menses unchanged the first, normal the second time. September 12th, on account of total cessation of the menses, the treatment was discontinued; October 12th, pregnancy was positively diagnosed, which terminated normally.

11. Mrs. Bekowitzki, wife of a coachman, 49 years of age, mother of 7 children, of which the last is 9 years old, ceased menstruating last year, *i. e.*, in her 48th year, after always enjoying excellent health. In January, 1874, the menses, however, returned and remained regular in quantity, duration, and interval up to May, but from May to September 30th, when the patient entered the hospital, the flow continued without interruption in a greater or lesser degree. On examination the fundus uteri was found to be midway between the symphysis and the umbilicus; the organ was not spherical, but moderately enlarged laterally, more in a longitudinal direction, and on bi-manual examination showed a considerable enlargement of the anterior wall of the corpus uteri, which, as only this portion of the uterus was implicated, not also the cervix and the posterior wall, with proper consideration of the symptoms was pronounced to be in consequence of the presence of a fibroid imbedded in the anterior wall. The cavity of the uterus measured 5" in length, and was also enlarged laterally. After the 8th injection, the hemorrhage ceased; after the 15th injection the patient was able to leave her bed. On the 3d of November, 1874, a normal, painless, moderate menstrual flow appeared, which lasted four days. November 11th, the 45th injection was made. A large hypodermic syringe-ful was injected *every day*. The patient was presented in the clinic on the last-mentioned day. She has made a *remarkable* recovery. On the abdomen there are still numerous nodules of greater or lesser size, some of which are sensitive to pressure. Abscesses have formed in this case as little as in the other cases. On examination, the fundus uteri was found close above the symphysis pubis; an enlargement of the anterior wall was no longer perceptible. The sound was



not introduced for fear of exciting hemorrhage. The uterus corresponded to that of a multiparous (7 children) woman.<sup>1</sup>

III. CASES IN WHICH THE INJECTIONS EXERCISED NO INFLUENCE  
WHATEVER EITHER ON THE TUMOR OR THE SYMPTOMS.

1. Mrs. W. H., 37 years of age, admitted to the clinic, January 6th, 1874. The patient has detected a somewhat painful tumor in the right half of her abdomen. Menstruation is normal; no leucorrhœa. Two tumors can be felt connected with the uterus, one of the size of an apple in the anterior laquear vaginae, attached to the anterior wall of the uterus; a second, somewhat smaller one, similar in size and shape to a normal uterus, is connected with the right uterine wall. From January 6th to 21st, an injection was made daily, without producing the least change in the tumor.

2. R. S., working-woman, 38 years old, admitted to the clinic June 28th, 1873. The uterus was changed into a tumor of the size of an adult head, with a smooth surface and firm texture. Menstruation was too frequent, and so profuse as frequently to be followed by syncope. The diagnosis was old submucous fibroid. Thirty injections were made without doing the least good. No diminution in the quantity of the flow, nor in the size of the tumor took place. The patient was discharged August 8th, 1873, in the same condition as when admitted.

If we review the various trials and experiments which have hitherto been made with favorable results in one direction or another, we find the influence of the ergot in these cases to be about as follows:

In obstetrical as well as gynecological practice it is well known that, however different and variable the action of ergot may be on the vascular and nervous system in other parts of the body, in the uterus it always exerts an energetic power, which shows itself in vigorous, rapidly succeeding, finally tetanic contractions. That it must be hazardous to endeavor to excite and sustain for weeks and months such uterine contractions by means of the continued internal administration of

<sup>1</sup> We received the history of this case in a communication from Prof. Hildebrandt, dated Nov. 11th, 1874, three months after the receipt of the remainder of the paper, with which by his permission we incorporate it.—Ed.

large doses of ergot has been definitely proved by our knowledge of toxicology. That ergot, however, may safely be injected under the skin in the neighborhood of the uterus for several months, without injuring the general health, has been equally clearly demonstrated by our experiments, which have likewise shown that, in the cases in which this method proved efficacious, in several hours, generally two to three, after the injection, extremely energetic uninterrupted uterine contractions came on. These contractions, in my opinion, are the active forces which cause the diminution of the tumors. As tumors in other parts of the body may be absorbed in consequence of compression, no matter how it is exercised, so myo-fibroids, when brought by a tetanically contracted uterus under a strong steady compression for a few hours every day or, better, permanently, may evidently be made, by means of the compression of the supplying vessels, fatty degeneration and absorption of the fatty tissues, to diminish in size and gradually disappear entirely. Whether this effect of the ergot, to produce compression by means of the uterine contractions, is the only active and beneficial one, I do not pretend to decide. In some cases I received the undoubted impression that the tumors became softer before they began to diminish in size. If such a softening of the fibroids were a regular result of ergotine injections this circumstance might perhaps be explained by the assumption, that the tumor becomes softened by the occurrence of venous, hyperæmia and arterial anæmia, which Dr. Wernich reports having observed in his experiments as the usual consequence of the action of ergot.<sup>1</sup> The favorable influence of the injections on the absorption of the tumors, if we consider the two above-mentioned theories as the probable ones in explanation of the action of ergot, is above all due to the anatomical relations of the tumors themselves, as also of their surroundings, and particularly of the walls of the uterus, and for this reason nobody should imagine, and I myself have never pretended or believed, that *every* uterine fibroid could be removed by injections of ergot.

Of the greatest importance is the consistence of the tumor

<sup>1</sup> Berliner Beiträge zur Geburtshilfe u. Gynäkologie, Vol. III., No. 1, p. 71, seq.

itself. Very old, anæmic fibroids, composed principally of dense connective tissue, can, of course, be reduced in size as little as though they had already undergone calcification. They are beyond softening, and compression will in no way promote the absorption of their tissue. If in these cases there are, however, still profuse hemorrhages and serous discharges from the uterus as consequences of the tumors, then it is well possible that these symptoms will be abated by contractions of the uterus and the consequent constriction of the blood-vessels. Such old, solid, anæmic tumors generally belong to persons of advanced years, who, as a rule, rarely suffer from the above symptoms. In young women, who suffer most from profuse hemorrhages and hydrorrhœa, the tumors are generally more vascular and spongy, and contain more muscular fibres, and such growths are naturally much more liable to atrophy after compression. Those cases, therefore, seem to me the most favorable for this form of treatment, in which the tumor possesses that degree of softness and elasticity, which renders it difficult for us to distinguish it merely by its consistence and shape from a dense elastic cyst. Such tumors, which are very common in the uterus, are best to be compared, as regards their texture, to the uterine tissue during the early stage of puerperal convalescence, and that the energetic contraction of the walls of a puerperal uterus exert the principal, almost sole, influence on the absorption of the old and the formation of the new tissue, and that likewise in that particular condition the uterus reacts most surely, rapidly, and energetically after the administration of ergot, are facts of daily experience, which nobody will undertake to deny. The case in which this softness and dense elasticity was most apparent is Case I. of my first paper, in which the complete absorption of the extensive tumor took place. The reason why in other cases a portion only of the growth was removed, is probably because after its soft tissues were absorbed, a residue of dense anæmic fibrous material was left, which was no longer capable of absorption. In regard to this point an opinion lately expressed by Prof. Spiegelberg (*Archiv für Gynäkologie*, Vol. VI., No. 3, p. 517), deserves mention, because it may aid to clear up and confirm the prognosis of the effects of hypodermic injections of ergotine. Spiegelberg had introduced sponge-tents into the

uterus of an unmarried lady, afflicted with a large fibroid of the left uterine wall. Very active uterine contractions followed this operation, and after two years only a very small portion of the tumor remained. Prof. Spiegelberg remarks in reference to this case, that he considers the complete absorption of an intramural fibroid possible only when it is not, as usual, enclosed in a capsule, but merges directly without any boundary into the tissue of the uterus, thus constituting only a species of partial hypertrophy of the uterine wall, a rather rare form of neoplasm, to be sure, but a specimen of which happens to be before him at that moment, and which is also described by Virchow (*Die Krankhaften Geschwülste*, Vol. III., p. 154). Prof. Spiegelberg believes that only such cases of fibroids without a capsule promise to be amenable to hypodermic injection of ergotine. I am willing to agree with Prof. Spiegelberg, that those fibroids which are unprovided with a capsule, and merge with no definable limit into the tissue of the uterine wall, are most liable to be rapidly and easily diminished and absorbed in consequence of energetic contraction of the uterus, but cannot admit that the capsule usually surrounding fibroids is an absolute impediment to a cure, because that capsule neither prevents the uniform compression of the tumor, nor is a serious obstacle to its absorption, nor is incapable of absorption itself. For the capsule consists of precisely the same textural elements of which the wall of the uterus and the bulk of the tumor are composed. Besides, my numerous cases, in which total or partial absorption took place, and which, as far as it is possible to ascertain by palpation, were all enclosed in a capsule (perhaps excepting only Case I. of my first paper), prove conclusively that the capsule is no direct and absolute obstacle.

In order to procure the removal of a uterine fibroid by compression, that is, by energetic uterine contractions, sound uterine walls, capable of contraction, are above all indispensable. We should be inclined, *à priori*, to suppose that a uterus with thin walls would be deficient in muscular fibres, and consequently but little adapted to produce such a result. This may be the case with some submucous and subperitoneal fibroids of large dimensions, which have greatly elongated the uterus; with tumors of medium size, the existence of thin uterine walls is less to be feared than induration of and exudation into the

muscular tissue. Those cases appear to be least favorable for the direct administration of ergot, in which chronic parenchymatous metritis, together with para- and peri-metritis are present, a not unusual complication. But even these cases may partly be made amenable to ergot by first subjecting them to an energetic course of treatment with brine and mother-lye baths. When the chronic irritation and inflammation, and the exudations in the walls of the uterus have been removed by this preparatory treatment, the uterine parietes will again become vested with contractile power, and the case thus be brought under the beneficial influence of ergot. Several of the cases cited above (see Cases 1 and 4 of the II. series in this paper) very probably belong under this category.

The site of the tumor is evidently of great importance for the success of the hypodermic method, which appears to have no effect whatever in subperitoneal fibroids, for they never decreased in size. This is by no means surprising, however, if my explanation of the action of the ergotine is correct, for the subperitoneal fibroid is attached only by its base to the muscular tissue of the uterus, and consequently cannot be subjected to universal compression, not even by the most violent tetanic uterine contractions. Still, even with these apparently unfavorable tumors, I have seen the patient derive benefit from the hypodermic use of ergotine. When strong permanent uterine contractions are induced, they spring more distinctly out of the wall of the uterus, and, pushing the peritoneum before them, become more and more isolated from the uterine wall. They then cause much less inconvenience to the patients, inasmuch as experience has taught us, that subperitoneal fibroids are the most innocent of all, for they rarely cause chronic metritis, uterine colic, metrorrhagia, or serous discharges, or prove an obstacle to conception. We have further seen in Case I. of the second series (Mrs. Boehl), that, after the more or less hidden fibroid in the anterior wall had been forced out under the peritoneum by the hypodermic use of ergotine, the formerly anteverted uterus regained its normal position, and that thereby the principal obstacle to conception, the anteversion, was removed. A more favorable site of a fibroid for the purpose of absorption is in the midst of the uterine wall, where it is completely surrounded by muscular tissue, and will necessarily be uniformly

compressed by the contractions of the latter. The most auspicious site, however, is, in my opinion, directly beneath the mucous membrane. In these cases the tumor, to be sure, is not completely surrounded by muscle, but only two-thirds, occasionally only one-half of its surface; but this muscular tissue is able to act with more vigor, because it belongs to the whole muscular coat of the uterus. The tumor will then be compressed partly in a circular direction, partly will be pushed against the tensely stretched mucous membrane, but principally against the opposite, also contracted, and therefore hard and unyielding wall of the uterus.

If we review all these circumstances, we are already enabled, after the comparatively small number of observations, to accept the following points as conclusively established on the prognosis of the treatment and cure of uterine fibroids by the hypodermic injection of ergotine. This treatment is most likely to be attended by favorable results:—

1. When the tumor is richly provided with muscular tissue and possesses the consistence and feel of a tense elastic cyst.
2. When the tumor is submucous.
3. When the walls of the uterus are sound, capable of vigorous contraction, not too much attenuated by dilatation or stiffened by exudation in their substance, and when there is no para- or peri-metritis present.
4. As soon as the chronic metritis and parametritis, which frequently accompany fibroid tumors, have been removed by proper preparatory treatment, when the previously mentioned conditions again come into force.
5. When the tumor is unprovided with a capsule and merges directly without a boundary into the peculiar tissue of the uterus, which anatomical relation of uterine fibroids may be considered most favorable to their complete cure by absorption.

KÖNIGSBERG, PRUSSIA, August 7th, 1874.

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# CASES OF CONGENITAL SYPHILITIC BONE-DISEASE IN CHILDREN.

Reported by P. BRYNBERG PORTER, M.D., New York.

DR. PAUL F. MUNDE,

*Editor of the American Journal of Obstetrics and Diseases of Women and Children :*

DEAR SIR : As appropriate to the subject of Dr. R. W. Taylor's exceedingly able and exhaustive essay, now appearing in your journal, I beg leave to call attention to some of the cases exhibited by my friend Dr. John S. Parry, in two clinical lectures on Inherited Syphilis, delivered at the Philadelphia Hospital, and reported in the *Philadelphia Medical Times* of September 2d and September 16th, 1872. Dr. Parry is acknowledged to have written the best treatise that we have on the lesions of Rachitis ; but he has also made a careful study of the above subject. He has had unusually ample facilities for observation, yet he acknowledged that up to that time he had only met with syphilitic bone-disease once in a child under two years old. The cases he produced were all those of children older than this, but in some of them the lesions of the osseous system were noticed as early as the end of the second year, which comes within the period described by Dr. Taylor. His second case is so interesting that I quote it at some length, together with a few of his remarks. It will be seen, however, that the lesions partake more of the character of those of acquired syphilis than in Dr. Taylor's cases, which is probably due to their later development.

*"Inherited Syphilis without the History of Secondary Symptoms—Severe Tertiary Lesions.*—E. H. aet. eight years. Her parents have had six children, of whom this one is the third. Of these only the eldest and our patient are now alive. The former is a healthy girl. The second child died early in its second year, of summer-complaint. The last three children are all dead, having perished within a few weeks after birth. Her father died four years ago of hæmatemesis. His wife says that he never had syphilis in any form, but that she was suffering from the disease at the time she conceived this child. . . . At birth it was perfectly healthy, and so continued until a month old, when an abscess formed on the back. This appears to have been the result of a contusion

which she received at the time. From this time until she was two years old she continued well, as far as her mother was aware. She was then attacked by infantile paralysis. Five or six months after the occurrence of the paralysis, which presented the ordinary characters of the disease, she began to suffer from convulsions. These were preceded by hard, painful swellings upon different portions of the head, but especially upon the parietal bone, where suppuration finally occurred. She was relieved by treatment, and remained pretty well until she was four years old, when she had nodes upon the upper part of the tibia, the backs of the hands, and the parietal bone. These were accompanied by cutaneous ulcers. When she was five years old, February, 1869, she was admitted to this hospital, suffering severely from these symptoms. Shortly afterwards a node appeared at the outer condyle of the left humerus, and gradually increased until there was swelling of the whole elbow, with slight synovial effusion. From then until now she has suffered from repeated outbreaks of tertiary symptoms. . . . .

*Present condition, June 5, 1872.* Pale and very anæmic. On forehead, in median line, is a depressed white scar, from which pieces of parietal bone were removed by Dr. Duer last fall. Cornea of the left eye hazy, from interstitial keratitis. (Right eye accidentally destroyed in infancy.) Copious and very offensive thick, purulent discharge from nostrils. Teeth small; upper central incisors imperfectly developed and slightly notched. Upon inspecting the throat, thick, yellow and very fetid pus is seen running from the posterior nodes into the pharynx. Upon the half-arches are superficial sloughing ulcers. At various points upon the surface of the body are the cicatrices of previous eruptions and ulcerations. She now has substernal tenderness, and there are rapidly advancing nodes on each tibia."

*Remarks:* "The patient furnishes you with a good representation of the lesions of the third stage of inherited syphilis. You will find these phenomena described by few writers; indeed, the general opinion has seemed to be that these symptoms belong to the acquired disease in adults, and not to the inherited children. It is asserted by Mr. Hutchinson that the nodes of inherited syphilis first affect the lower part of the humerus. I have now under my care a patient in whom the first bone-dis-



case was in this part, but I should certainly say, from the cases I have seen in this hospital, that the forehead and tibia are as likely as the humerus to be primarily affected. There is one point upon which I wish to dwell for a moment before leaving this case. This is the course of the nodes when they are situated near large joints. We have had ample opportunities of studying this in our present, as well as in some other cases. The patient, after a few days of complaint and inability to move the arm, had swelling of the elbow, accompanied by some synovial effusion. The danger is that you may mistake this condition for synovitis, especially if the secondary symptoms have passed unnoticed, and this is the initial bone-lesion of the third stage of the disease. I have seen this error committed in one instance. It is when the child is first seen at this stage that the error in diagnosis is most likely to be made, but you will be able to arrive at the truth if you examine the joint carefully, and above all, if you feel the node upon the epiphysis, for it was in this part that the disease was located in the children of whom I have spoken." Dr. Parry then alluded to a case which he published in the *Photographic Review* for February, 1871. "In that instance the disease appears to have been transmitted from the father, and the child remained well until she was two years and nine months old, when nodes appeared on the tibia, and rapidly produced destruction of the bone. The illustration accompanying the history of the case shows that the disease was of no ordinary severity; indeed, I do not remember to have ever seen it greater in any of the many and terrible examples of acquired syphilis that I have had the opportunity of examining." Dr. Parry also spoke incidentally of a case of his in which the child, when a year old, was noticed to have a sparse, poorly-developed, scaly eruption on the thighs, buttocks and abdomen, and a little later began to suffer from nodes. "The most severe bone-lesions," he remarked, in regard to this case, "may follow the most trivial secondary manifestations."

His last two cases, though scarcely admissible in this connection on account of the age of the children, I am tempted to give a *résumé* of, as they are both characterized by dactylitis. In both the syphilitic history is well authenticated.

CASE V.—*Inherited Syphilis: Rupial Eruption on the*

*Forearm: Dactylitis Syphilitica.*—Mary W., colored, æt. eleven years. Her mother died when she was eight weeks old. Her grandmother says that when she was two years old she had an eruption which appeared as large red blisters. These afterwards became white, and broke; when thick, crusts formed on them. She was first admitted to the hospital in May, 1870. At that time there was some enlargements of the lymphatic glands on the right side of the neck; while the left shoulder, arm, and forearm were covered by well-developed rupial crusts. After remaining in the hospital for nearly a year, she was discharged without being much improved. In December, 1871, she was readmitted. Some months before this some of the fingers on her left hand began to swell, and when she was admitted her middle and ring-fingers were much enlarged and very tense. . . . . *Present condition, May 29, 1872.* Upon various parts of the body she presents scars of the previous skin-disease. The angles of the mouth are fissured and puckered. On the left cheek is a large rupial crust, and the left forearm and back of the hand are covered with crusts and cicatrices. The proximal phalanges of the middle and little fingers of the left hand and the phalangeal articulation of the former are much swollen. This is more manifest upon the dorsal than upon the palmar surface, and the former is broader than the latter. The skin over the affected parts is tense, and the folds in it are effaced, and the mobility of these fingers is much impaired. The child does not complain of pain in them, and they may be firmly pressed or moved without objection on her part. There is no crepitation in the movements of the joints. . . . . The hand applied to these parts detects no elevation of temperature. The ring-finger is much shortened, so that its distal extremity reaches just beyond the proximal phalangeal articulation of the middle finger. It is one-fourth of an inch shorter than the little finger. This deformity is due to destruction of the whole of the proximal phalanx. The metacarpal extremity of the middle phalanx has been destroyed, as well as a small part of the distal end of the metacarpal bone itself. The nails on all the fingers are perfect and healthy. She has commencing interstitial keratitis in one eye. Her teeth are moderately well formed, but the upper central incisors are imperfectly developed and slightly notched.

CASE VI.—*Inherited Syphilis : Dactylitis Syphilitica : Hutchinson's Teeth.*—W. H. H., colored, æt. ten years. Has been an inmate of the hospital since infancy. Five years ago he suffered severely from nodes on the humerus, ulna, and other parts of the body, with dactylitis, which suppurated after a long period of inactivity, and destroyed the whole of the proximal phalanx of the ring-finger on the right hand. The disease is now entirely inactive, but the affected finger is a mere stump, which scarcely reaches the second joint of the little finger.

65 WEST 48TH STREET, *October, 1874.*

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SYPHILITIC LESIONS OF THE OSSEOUS SYSTEM IN INFANTS  
AND YOUNG CHILDREN ; THEIR CLINICAL HISTORY,  
PATHOLOGY, AND TREATMENT.

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(Concluded from August number, p. 232.)

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XXIII.—PATHOLOGICAL ANATOMY.

WE now come to the consideration of the nature and character of these osseous lesions, and, in order to clearly and correctly understand them, it is necessary to recall to mind the minute changes which take place in the development of bone, as these affections are, in the main, deviations of greater or less extent in the course of the normal growth of that tissue. These changes we have found to be seated in two distinct portions of the bones ; at their ossifying ends, and on their surfaces : consequently, as the conditions of development are somewhat different, we shall have to study them separately, beginning with the lesions of the diaphyso-epiphysal junction.

Normally, there exists at the end of the spongy portion of the shaft, and between it and the cartilage, which may be permanent, as in the ribs, or temporary, as in the other long bones, a narrow line of cartilage, somewhat lighter in color than the rest, which can only be detected by careful examination. This line

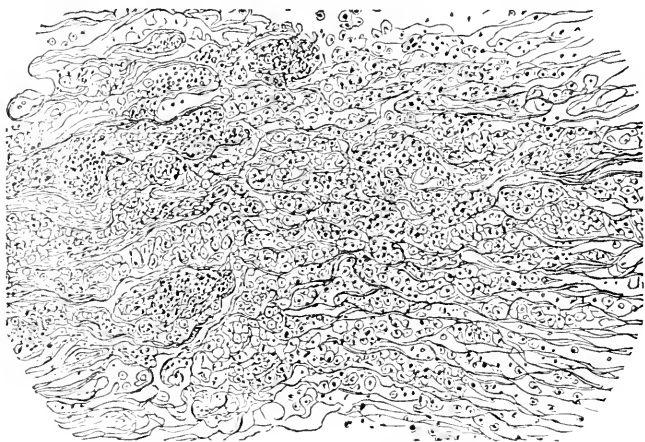
is very narrow, being the layer called by Guérin the *couche chondroïde*, and in it take place the processes which precede the formation of bone. It extends transversely across the end of the bone, either in a straight line or in a curve. The ossifying process may be briefly described as follows: At the distal end or edge of this layer the cartilage cells are found to be enlarged, flattened, and placed the one on top of the other, in such a manner that they appear as if arranged in so many vertical lines. The tissue on each side of these lines is the cartilage matrix, forming a framework or trabeculae, from which thin processes of this tissue pass between each flattened cell. This prolongation inwards, however, is exceedingly thin, and, as we approach the bone, becomes gradually thinner, until finally, from the very close approximation of the cells, it disappears altogether. Passing down towards the bone, we find, of course, that the cells are packed more and more closely together, so that at last they touch, and leave no intervening tissue. But between the rows of cells in the longitudinal direction the cartilaginous trabeculae continue to exist; but near the bone, that is, near the proximal edge of the layer of Guérin, it is noticed that these become slightly granular, being here cartilage which has become calcified, from the deposit of lime salts. Following the cells up towards the bone, we observe that near it they lose abruptly their peculiar character, becoming large, granular, and terminating in processes, varying in length, and somewhat caudate. Then, examining the condition of the parts, just as the cartilage and bone meet, we find that the trabeculae have become firm, and here consist of a tissue ready to be converted into bone. They are more susceptible of color from carmine here than further on, and this shows that it is a nascent tissue. On examination, these trabeculae are found to form canals which run chiefly in the longitudinal direction, though some transversely. Within these channels, or medullary cavities, we find the peculiar granular cells which are called osteoblasts, arranged in concentric circles; and into these also project the vessels, which are developed from the spongy substance of the diaphysis. So that, to sum up, we have in this region, as factors of the future bone, a calcified matrix perforated by canals or medullary cavities which are filled with osteoblasts or cells, which then undergo change, and, it is probable, form the

lacunæ and also vessels in abundance. Some text-books on histology give very clear illustrations of this process. Though we cannot state precisely the exact changes, yet we know that it is upon the calcified matrix, the cells, and vessels, that the formation of the bone depends. In the healthy state the line of demarcation between the cartilage and the spongy bone is sharply and accurately marked. In syphilitic infants, as we shall find, this condition is very much altered.

In giving the description of the pathological changes, I have thought it best to follow Wegner in his division of the subject; but the appearances I give as observed by myself, as in some minor points we are at issue. He describes three stages of this affection of the ossifying process. In the first stage, if the bone be examined with the naked eye, it is seen that the line of Guérin is not as even and regular as normal, but somewhat wavy and irregular; it is perhaps twice thicker than usual, being, we assume, from a half to a line in width. It has a white shining or whitish-red color, and is compact of structure. Under the microscope, the abnormal width is clearly seen. The cartilage cells are found to be proliferated in an unusually abundant manner. The lesion is then in this stage simply an exuberant cell proliferation, without corresponding ossification. In the second stage, we observe that the line of Guérin is rather more uneven in its relation to the epiphysal cartilage; that it is nodulated; and that there are warty or papillæ-like processes of calcified cartilage projecting into the distal hyaline matrix. Wegner compares them, from their broad bases and tapering ends, with the papillæ of the cutis. Between these papillæ, if we may so call them, in the hyaline cartilage, we find spots of lime appearing like isolated clusters of calcified cartilage. On the periphery the infiltration encroaches further into the cartilage than at its centre. Then, when we examine the relations of this calcified line to the spongy bone, we find corresponding depressions into which the spongy tissue passes. When a section in this stage is examined under a lens of three hundred diameters, we observe that the longitudinal rows of the cartilage cells are more abundant than in the first stage, and that there is very little intercellular substance. The vessels are abundant, and their canals at the ossifying line are surrounded by a considerable quantity of

connective tissue. The walls of the cavities are broader at their bases, and are sclerotic. In many places an osteoid substance is developed from the cartilage, and from the medulla which enters with the vessels. This substance is found to be in some places true bone, which passes into the spongoid layer. Beyond the layer of Guérin, we find irregularly distributed spots of calcified cartilage, forming a zone of considerable breadth.

The principal points in the second stage, then, are greater pro-



liferation of cartilage cells, premature sclerosis of the intercellular substance, formation of bone in the form of processes beyond the normal layer, and delay in bone formation elsewhere; in other words, irregular osteogenesis, abnormally premature in some spots, in others retarded. In the third stage there is a general enlargement of the epiphysis, with a thickening of the perichondrium and periosteum. Under the microscope the following appearances are discoverable: The lowermost layer of hyaline cartilage is bluish, transparent, moist, and swelling when cut. Then comes a layer irregular and wavy, with serrated processes, exhibiting a grayish-white and homogeneous mass. This layer, though greatly altered, is brittle, and can readily be removed. Next to this comes a layer of grayish-red or yellow substance, soft, and sometimes viscid, which is gradually lost in the spongy substance of the diaphysis. The medullary tissue of the latter continues for a considerable distance further, and, instead of being of a normal

red, is of a gray or grayish-red color. This layer seems to destroy the firm cohesion of the epiphysis to the shaft. Under the microscope, we find, in this stage, that the proliferation of cartilage cells is greater, as is also the lime infiltration. In the layer nearest the bone we see nucleated cells, a granular detritus, and spindle-shaped cells. In this, the third stage, the layer which is just described after Wegner, in reality consists largely of granulation-tissue. This tissue is formed at the end of the shaft in great abundance, and follows the vessels into the medullary spaces. Wegner does not consider it a granulation tissue, or at least does not say so. My sections show clearly that it is such, and Waldeyer and Köbner say that they observed this tissue. The changes may then be summed up as follows: In the first stage we have a simple hyperplasia of cells, with irregular deposition of lime salts; in the second, an intensification of this condition; and in the third, a new element, namely the abnormal proliferation of all the elements of the tissues, with an infiltration of granulation-tissue into the medullary spaces following the vessels. In the first stage we find nothing of this kind. This is the condition simply and succinctly stated. Wegner calls the process osteo-chondritis, and considers it due to irritation which arises from the condition of the blood. As such, it would not be a specific process; but when we consider that there is proliferation of granulation-tissue, we must certainly regard this opinion as faulty. Waldeyer and Köbner do not, as I have said, partake of this view, but are disposed to look upon it as a specific process. Parrot rejects Wegner's view of the origin of the disease, not seeming to be aware of the views of Waldeyer and Köbner, and applies to it the name *dystrophie syphilitique des os*. As this simply means an abnormal condition of nutrition, it does not in any degree place the matter in a clearer light. He thinks that the process is not at all of an inflammatory nature. When we examine this morbid process, we certainly see an inflammatory condition in it; wherefore, on this subject there can be no doubt; so that I am disposed to look upon it as an exaggerated and perverted nutrition of these tissues, in some instances complicated by the proliferation of a granulation-tissue. Wegner thinks that he did not find many vessels in the region of cartilage thus affected, but Waldeyer and Köbner distinctly say they found them in abundance, and

my own preparations lead me to coincide with them. Applying these details to clinical observation, I think we may assume that in the majority of cases of swellings at the diaphyso-epiphysal junction, the morbid alterations do not pass beyond the second stage ; consequently, that they are scarcely ever composed of granulation-tissue. In the cases in which we found superficial destruction of the swelling, it is very probable that the necrosis was due to localized degeneration of the cartilage cell elements, and that the granulation-tissue was not formed. But in the cases in which there was separation of the epiphyses from the diaphyses, granulation-tissue was undoubtedly formed, which softened down, and then destroyed the continuity of the bone. Thus we have a convincing reason why the swellings run the course which they are seen to take. The presence of granulation-tissue in this inflammation shows us its specific character, as we know that this is one of the constant products of syphilis. It brings to our mind the fact already elicited, namely, that its development in the bone lesions of infants is not as constant as it is in those of older children. Thus, in infancy, the lesion is of the inflammatory nature above described, superadded to which we have, in very marked and severe cases, granulation-tissue infiltration ; whereas in bone lesions of older children we shall find that granulation-tissue is a very constant morbid product of hereditary syphilis. It is almost needless to say that mature granulation-tissue constitutes the so-called gummy masses. In the light of this knowledge, we must look on the cases in which granulation-tissue is formed as representatives of the most advanced of the morbid changes in children ; the simple form of inflammation is, however, the more common. It seems somewhat anomalous that the bones should not be invariably the seat of granulation-tissue infiltration, seeing that in the viscera of infants we so constantly find this tissue in great abundance.

Such, then, are the clinical facts as explained by pathology. The situation of these swellings being similar to those of rickets, it is easily seen how they might be, and have been, mistaken for that disease. We shall speak further on of the diagnostic points as observed at the clinic ; here it is only necessary to allude to the fact, that in syphilis there is a superabundance of a calcareous deposit, besides the other morbid



changes, while in rickets everything is normal, except that the cartilage cells are exuberant in quantity, and that the cartilaginous trabeculae are not calcified. Then, in syphilis the essential changes are strictly limited to the epiphysis, certain other changes being adventitious and secondary, while in rickets the whole bone is involved, though the changes are most perceptible in this part. There is a pathological fact of some interest which explains a feature observed in the clinic, which is, that in many of the cases the changes in the bones are found in various stages of development, some just beginning, and others fully formed; this accounts for the variety of size in which we find the bone swellings.

The lesion upon the flat bones is periostitis, and this may be of the same varieties as are found in the acquired syphilis of adults. In cases such as we shall usually meet in practice, it is probable that the inflammation is of the proliferative or fibrous form, being then a simple periostitis. Though we should expect, from the general character of the osseous lesions in infants, to find the periostitis, as a rule, to be of this variety, though really of an inflammatory nature, there is every reason to believe that we may also find the gummosus form of periostitis. This difference is, however, simply one of degree; the first is a hyperplasia of the normal tissue of the periosteum, while the second is the same process complicated by the additional proliferation of a granulation-tissue. We have found instances of this gummosus form of periostitis as detailed in the various cases of Bargioni, Parrot, Bärensprung and Desmarest; but these cases are examples of the most severe and fully developed type of osseous lesion, similar in character to those in which we find separation of the epiphyses from the diaphyses. In one of my cases large nodes were found, upon the resolution of which a loss of tissue was observed. This condition points to the existence of an infiltration of granulation-tissue, and its subsequent fatty change, with absorption of it and the normal cells of the texture. Wegner found very frequently proliferating periostitis of the skull, and in one instance general hyperostosis. Thus, then, we may conclude in the majority of cases, such certainly as are usually met with in clinical practice, that the lesion will be found to be a simple proliferating periostitis, but that in exceptional ones we may find the

gummaous form. In the latter there may be great destruction of bone and of the investing integument.

The morbid anatomy of periostitis has so often been described that I think it superfluous to go minutely into its consideration here; on which account I confine myself to a general sketch of the subject.

We have found in the clinical part of our study that periosteal swellings of the shafts of long bones are not very common. Still, they may be met with, and will be of either of the two varieties above mentioned. In cases of osteochondritis of the bones we find well-marked thickening of the periosteum and of the perichondrium. This is usually limited to the focus of the lesion, and only exists as a complication; which we have observed to act in a very beneficial manner in those cases in which the epiphyses became separated. Here the proliferating process becomes very active, assumes an ossifying state, and, by the formation of a bony tube, prevents the total destruction of a member, acting as a splint.

The lesion is of a complex character when the phalanges and metacarpal bones become inflamed. We have no microscopic data upon which to speak positively, so that we are forced to reason by analogy, as well as by the clinical history of the swellings. It is probable that the affection begins in the periosteum, and that the cell-genesis is very copious, since the size of the swelling is sometimes considerable. At the same time the cancellous structure of the bones becomes involved, and we have general enlargement of it. These two morbid changes involve also the nutrition of the cartilage of the epiphysis, and here also we have hyperplasia. Thus the condition is periostitis, osteitis, and perhaps osteochondritis. In such profound bone lesions, it is common to expect a considerable degree of subsequent deformity, and we have already called attention to instances of permanent enlargement, and also to hypertrophy in the longitudinal direction. In the small irregular bones the lesion is a cellular hyperplasia beginning probably at the centre of ossification, and consisting in a very active and exuberant proliferation of the cartilage cells. There is also a concomitant periostitis. In this form of inflammation, also, the periosteum plays an important part, as from it new bone is formed, which takes the place of that lost by softening, when such occurs, of the pro-

liferated cell elements of the cartilage. The bone may remain smaller and perhaps distorted.

The periostitis, besides being of the simple or proliferative and gummosus form, may also be of the ossifying variety. In fact, in some of the bones, the history of which we have studied, there has been this complication; and it is well to remark that we may expect to find it, seeing that ossifying periostitis is a frequent sequela, or, in point of fact, the advanced form of the proliferative variety, when it runs a chronic course, and is not complicated by degenerative changes. Thus, it will be seen that in infants the whole structure of the bone is liable to inflammation. It may be limited to a region or a tissue, may involve more than one tissue, and, in point of fact, each and every component tissue of the bones. The lesion is usually of an inflammatory type, consisting in a hyperplasia of normal tissues, and in cases somewhat exceptional, a new tissue formation is super-added, namely, the granulation-tissue, and this complicates the other form of trouble. All of which lesions are intimately associated with, if not perhaps excited by, the activity of the nutrition of these structures, necessitated by the advancing requirements of the new being.

#### XXIV.—THE QUESTION OF THE RELATION BETWEEN RACHITIS AND SYPHILIS.

It is necessary, in order to render complete our study of syphilitic osseous lesions, to consider the relation between rickets and syphilis. This question, though, in strict truth, a side issue rather than a leading point, is rendered all the more worthy of study by the fact that the views generally held regarding it are not clearly drawn, and are wanting in scientific precision. By most authors the point is summarily passed over with the assertion that syphilis may cause rickets, leaving the pathological relation of the two diseases wholly untouched. This is one of the many instances in medical science in which conclusions are drawn from coincidences, rather than from study, and a rigid induction of a number of cases. Now, it certainly does happen that children the subjects of hereditary syphilis become rachitic, but it does not necessarily follow that the latter condition was caused by the syphilis. It is somewhat surprising that so careful an observer as Parrot should have fallen into this error. He

reported recently a case<sup>1</sup> of a child born syphilitic, who, when ten months old, became rachitic. The history of the infant in the interval is not given. In his deductions from the case,<sup>2</sup> he appears to think himself warranted in stating that syphilis may be considered as one of the causes of rickets. The effect of such assertions is to perpetuate error; indeed, the case of Parrot has already been quoted in an unqualified manner. Waldeyer and Köbner report a case of rickets in a syphilitic child; while Poncet,<sup>3</sup> in an analytical table of cases of infantile osseous syphilitic lesions, reports one in which rickets supervened.

Submitted to a rigid scientific examination, this question should be put as follows: Is rachitis one of the usual conditions or lesions produced by syphilis? This brings the question to a scientific standpoint, while if it is put as follows: Can syphilis cause rickets? it is unprecise and not in accordance with our advanced views. In the light of recent knowledge of the pathological histology of syphilis, we know that there are certain well-marked lesions developed in the various organs and tissues by that disease; also, that besides producing these lesions, which may be considered specific in character, it may induce a general condition of cachexia. This latter condition may impair the function of organs, and induce disturbances of nutrition, which, though they owe their origin to syphilis, cannot be properly and scientifically called syphilitic. In the previous chapter we have found certain well-marked lesions, and both clinical and pathological facts warrant the assertion, that they are specific in character, peculiar to syphilis, and produced only by an active condition of that disease in the organism. When compared histologically, the lesions of rachitis and syphilis are found to be very dissimilar; now, as there are undoubted lesions induced by syphilis, it certainly is fair to infer that lesions entirely different in character are not induced by it. Then, again, looking at the origin of rickets, it is found to be a disease of development due to the absence of some of the component parts of the blood. This condition does not obtain in syphilis. Therefore I think that as syphilis has its own clearly-marked osseous lesions, which differ so strongly from those of rachitis, and as the

<sup>1</sup> Observation de Rachitis d'origine Syphilitique. Gazette Médicale de Paris, No. 14, 1874.

<sup>2</sup> Op. cit.

<sup>3</sup> Op. cit.

latter disease is induced by a state of the blood not observed in syphilis, that, in point of fact, there is no connection between the two diseases. We are, then, in the position to state definitely that there is no specific relation whatever between rickets and syphilis. But it is not well to dismiss the case by simply considering syphilis in its specific manifestations. We have already alluded to its power of inducing cachexia, of impairing the nutrition of tissues, and the function of organs. Now, it is in this influence, in my opinion, that the connection between rickets and syphilis exists, if it exists at all. The condition of cachexia is frequently induced by syphilis in the child, and results very often in lowering its nutrition, and renders it liable to intercurrent diseases. In this condition we observe glandular engorgements, catarrhs of mucous membranes, tendencies to local congestions, and other affections, which, without being specific in character, remotely owe their origin to syphilis, and as such cannot, with accuracy, be classed as syphilitic. In this condition it is very probable that rachitis may develop itself, as we know that debilitating and adynamic influences are potent in the causation of that disease. Yet under the circumstances the specific action of syphilis does not take place, but it acts remotely as other lowering influences do. So that while we are prepared to admit that syphilis may be one of the causes of rickets, it must be understood to arise in the qualified manner we have specified. A point of importance as corroborating the view that rickets is not identical with syphilis (to state the question clearly) is that, in any given case of a syphilitic child, who becomes rachitic, the latter disease is not at all under the control of anti-syphilitic remedies; and we know full well the great influence they exert over tissue changes due to the specific action of syphilis. Finally, there is a clinical point of some weight, which is in support of the view either that rachitis in syphilis is a result of the cachexia, or that it is a mere coincidence; which is, that the rachitis, as observed in many of the cases, appears late, after the syphilis is exhausted, so to speak, or has been thought to be cured; in other words, not in the regular period of evolution of syphilitic lesions, but many months after, at a period when we expect the cachexia as a result of the influence of the syphilis; indeed, at a period when a child not affected with syphilis would be liable to it.

## XXV.—THE DIFFERENTIAL DIAGNOSIS.

In drawing the distinguishing features of these swellings from those produced by other affections which may simulate them, we shall follow the same general division which we have established in the study of their clinical history. Diagnosis is always one of the most essential parts of clinical investigation, and at the present time, in the study of the syphilitic bone-affections, it becomes urgently necessary that it should be clearly and accurately elaborated. The swellings at the diaphyso-epiphysal junction are liable to be mistaken for three different affections. In their first, or resolute form, they may be confounded with rickets; in the form in which the swellings are locally developed on either side of the bone, they may be mistaken for hereditary epiphysal exostoses; in the third, or degenerative form, in which separation of epiphyses occurs, they may be falsely diagnosticated as cases of abscess, or synovitis, or of that form of bone inflammation which has been variously called *osteite*, *ostéopériostite juxta epiphysaire*, *abcé sous périostique aigu* (Chassaignac), *decollement des epiphyses*, *epiphysentrennung* (Klose), *medullite aiguë des os*, *ostéides epiphysaires des adolescents* (Gosselin), necrosis, and separation of the epiphysis. The idea of fracture might possibly occur, but it could be readily dissipated by a study of the case. There are also points of diagnosis in the syphilitic osseous lesions of the clavicle, of the bones of the hands and feet, and of the cranial bones, which require study. That form, also, in which the swellings undergo superficial necrosis is liable to be confounded with certain other conditions, which we shall take care to consider.

*Diagnosis of the Osseous Swellings of Syphilis from those of Rickets.*

There are certain points in the concomitant symptoms and lesions which, if clearly brought out, will generally establish the difference between rachitic swellings and the osteo-chondritis syphilitica. Thus in rickets we generally have a prodromal stage in which the general health of the child shows signs of impairment by well-marked symptoms; a condition not observed in syphilis. A point of the greatest importance to remember

is, that usually these swellings in syphilis show themselves very soon after birth, having been developed, in all probability, in utero; while, in rickets, they usually come on after the sixth month, but though in some rare instances at an earlier date they are hardly ever formed during the fetal period. Then, again, in syphilis there is usually a history of other symptoms or manifestations, such as snuffles, coryza, cutaneous and mucous lesions; in addition to which, though the condition of the child may give evidence of cachexia, it is not, in the great majority of cases, as well marked as in rickets. In the latter disease the syphilitic symptoms are wanting, and the following is more probably what may be expected. The child is pallid, is noticed to sweat around the neck and head, is restless at night, and troubled with gastro-intestinal disorder, soon followed by a general hyperæsthesia. A little later we find bone lesions, and perhaps laryngismus stridulus, with convulsions. All of which prodromal symptoms are wanting in syphilis, and do not make their appearance at similar periods. Thus, in syphilis, though we find the radius, ulna, tibia, and fibula enlarged at either end, we very rarely find the skull-bones and ribs to be involved coincidently. In rickets the lesion is generally upon the occiput, and consists of a thinning of the bone in spots, constituting the condition known as soft occiput or cranio-tabes; while at the same time a thickening is observable at the sutures. These, moreover, are, in almost every instance, present. In syphilis the lesion consists of a circumscribed tumor, or tumors of greater or less extent, seated upon the frontal and parietal bones, and rarely upon the occipital bone. These lesions, moreover, are not very common in syphilis. In rickets the ribs are almost always implicated; so that Dr. Parry, who has written two of the best and most comprehensive<sup>1</sup> articles, in any language, upon this subject, and whose experience is very great, says that he has met with but one case in which the forearms were affected and the ribs not.

In rickets the extremities of all, or of nearly all, of the ribs are enlarged symmetrically; while in syphilis the number so

<sup>1</sup> Observations on the Frequency and Symptoms of Rachitis. *American Journal of Medical Sciences*, Jan., 1872.

Remarks on the Pathological Anatomy, Causes and Treatment of Rickets. *Same Journal*, April, 1872.

affected is small, and the swellings unsymmetrical. In syphilis the fontanelles are noticed to close at the usual period; in rickets there is delay. The subsequent course of the bone trouble is conspicuously different in the two diseases, being generally followed in syphilis by resolution, without change; in rickets, on the contrary, we may find both bending of the shaft, and distortion of joint. In syphilis also there is a tendency to necrotic degenerative change, which never occurs in rickets. The main points, therefore, to guide us in this differential diagnosis are found in a comparison of the prodromal and concomitant symptoms, in the difference noticed in the periods of evolution of the bone lesions, and in the changes in the cranial bones, which in rickets are clearly distinct, as well as of invariable occurrence; bearing in mind, also, that the ribs are so frequently, universally, and in a symmetrical manner, involved in rickets, in direct opposition to what may be observed in syphilis. In cases of syphilitic bone lesion in which, in addition to the changes which resemble those of rickets, we find nodes, enlarged phalanges, and metatarsal bones; but especially when degenerative changes and other concomitant symptoms, such as sinuses, cutaneous ulcers, or synovitis exist; there can be no doubt entertained as to the syphilitic origin, to the total exclusion of rickets. As there is a probability of the coincidence of rickets with syphilis, some uncertainty might perhaps exist in any individual case as to the real cause of the bone lesion. In this event attention to the points already brought out will lead to correct conclusions, and will enable the surgeon to institute a proper treatment. If, in such a case, the prodromal symptoms of rickets are detected (and they should be carefully inquired after), and if then the lesions had been developed after the manner just stated as being peculiar to rickets, it is fair to assume that the case is one of the latter disease. In such an instance the age of the child would be an important consideration; for as rickets usually appears after the sixth month, and very rarely before, and as the number of bones involved is usually large in syphilis at this early age, there would in all probability be a smaller number of bones affected, and the symmetry of evolution would not be as well marked as in rickets. Besides this point, the others already brought out would, if carefully considered, lead to a correct diagnosis.



*Diagnosis of Swellings at the Sternal end of the Clavicle.*

In the event of the swelling involving the sternal end of the clavicle, it is well to bear in mind that near this situation we may have enlarged lymphatic ganglia, or gummy tumors of the sterno-cleido-mastoid muscle, the latter being developed usually near the tendon. Both of these might perhaps be incorrectly regarded as bone swellings; but if the child's head be allowed to fall backwards, and the parts then examined, all doubts will be quickly removed. Gummatus ulcers occur at this site, and are to be diagnosticated by their implicating only the skin.

*Diagnosis of Swellings complicated with Superficial Necrosis.*

In the cases of superficial ulceration of the integument, and of destruction of the upper part of the bony tumor, the peculiar features of which have already been brought out, mistakes might be occasioned by regarding them as gummatus ulcers, or even as inflamed bursæ in the situation of the malleoli, but an inquiry into the history and features of the case will enable us to remove the error. The position of the ulcer or ulcers will be a point of some significance, and an examination with a probe would very probably discover that their base is seated upon the bone; upon which, besides, it may, in many cases, be found that the edges are movable. In adults it is a well-known clinical fact that gummatus ulcers develop in greater frequency at the upper and lower thirds of a limb than at its middle; but in children having hereditary syphilis, this feature, according to my observations, is not so well-marked, and, consequently, does not so frequently arise as a source of error in diagnosis. In infantile life, since bursæ are as yet so slightly developed, and not at all liable to suppurative inflammation, these ulcers should not be attributed to this cause.

*Diagnosis of Swellings seated on the lateral Borders of the Shaft.*

In case we find the localized tumors at the diaphyso-epiphysal junction of either side of the bone such as we have already described, we perhaps might mistake them for hereditary epiphysal exostoses; but the latter swellings are scarcely if ever congenital, rarely appearing before the end of the first year; attain to variable sizes, many of them being much larger

than we ever discover in syphilitic swellings, some even being as large as an orange; they may coexist with smaller osseous growths on the shafts; and, besides, not being attended with any other syphilitic lesions and symptoms, are, of course, uninfluenced by anti-syphilitic treatment, which causes those of a syphilitic nature to subside rapidly. In this connection, it is well to direct attention to a remarkable case<sup>1</sup> reported by Dr. Poore, of the Charing Cross Hospital, London, and also to Virchow's admirable lecture upon osseous<sup>2</sup> tumors.

*Diagnosis of those Swellings in which there is Separation of the Epiphyses from the Diaphyses.*

The clinical facts brought out by the various cases show that this complication may supervene, and proceed either rapidly or with comparative slowness. If sufficient attention is bestowed upon the case, the diagnosis of simple abscess will certainly not be arrived at. Leaving out of consideration the history of the case, and perhaps the existence of syphilitic lesions, or, again, traces of such as have passed away, there are peculiarities in these cases which will assist in making the distinction. Thus the fact that the bone is enlarged in its whole diameter, with softening localized at one spot, or perhaps extending more or less around the limb, is distinctive of bone lesion rather than of phlegmonous inflammation. The position of the inflammation would also seem peculiar, and the amount of functional impairment or disturbance would be out of all proportion for an abscess of whatever severity. If seen before necrotic changes supervene, the case will not be liable to be thus regarded; and if, as so often happens, a similar condition, though in a less advanced stage, exist in other portions of the extremities, a false conclusion will scarcely be arrived at. There is a bare probability that this condition of separation of these segments may be mistaken for synovitis. In the legs, as the epiphyses are of considerable length, the focus of inflammation will occur so far up the shaft that this suspicion can hardly be entertained; but in the arm and upper part of the forearm, or even at the approximating ends of the femur and tibia,

<sup>1</sup> Hereditary Exostoses, *Lancet*, page 771, November 29, 1873.

<sup>2</sup> *Pathologie des Tumeurs*, Trad. Franc. Dix-septième leçon, Tome Deuxième. Paris, 1869.

where the epiphyses are shorter, the inflammation being so closely contiguous to the joint, might be regarded as having its focus in it. The distinguishing feature would be the comparative absence of pain both in moving the joint proper, the segments being held steadily, and also when the articular surfaces are pushed forcibly together. Besides this, the inflammation of the connective tissue would be much greater at a much earlier period than in synovitis. In either event, whether the case be looked upon as abscess or synovitis, an incision being made, the nature of the morbid condition can be clearly understood. In those very severe cases in which there is total destruction and perhaps extrusion of the epiphysis, the gravity of the lesions would indicate the state, and then it would be necessary to determine whether or not it was due to syphilis.

As before stated, the fact of the separation of the epiphyses from the diaphyses being due to a syphilitic cause, might be overlooked, and the case be regarded as simple in its character, when one of the names already mentioned could be assigned to it. There are certain facts and features connected with the syphilitic process which materially assist in arriving at just conclusions. Let us consider, first, the features of the simple or non-specific form of inflammation, and then contrast them with those presented by the syphilitic. There occurs during the period of development of the bones a violent form of inflammation, which often results in the separation of the distal segments from the shafts. This accident occurs usually subsequent to infancy, or during the period of adolescence; hence called by Gosselin<sup>1</sup> *ostéide épiphysaires des adolescents*, while Frank,<sup>2</sup> who has written a good account of it, (and it is singular that such is totally wanting in the English language,) denominates the condition *Krankheit der Entwicklungsjahre*. For my own part, I am inclined to think that it rarely if ever occurs in infancy, and that the view of Gosselin, that it is a trouble coincident in development with the ossification of the epiphyses, is sustained by clinical observation. I cannot find an instance anywhere mentioned of its occurrence

<sup>1</sup> *Mémoire sur les Ostéides épiphysaires des Adolescents.* Archives Générales de Médecine, Nov., 1858.

<sup>2</sup> *Ueber entzündliche Epiphysenlösung, eine Krankheit der Entwicklungsjahre,* Giessen, 1861.

in a child under one year of age, nor have I ever seen such. Frank states that it may occur between the twenty-third day and the twenty-first year; but the only example of it which he cites in the infant, is the case of Valleix, which, as we have seen, is very probably syphilitic in its nature; his other cases, as well as those reported by other observers, are those of adolescents. Here then we have an important fact which materially assists us in arriving at correct conclusions. All of the recorded cases of this form of lesion, when produced by syphilis, have been those of infants under three months, while the simple form is shown to appear much later in life. In syphilis the inflammation is coincident with the development of the shaft; in the simple form it coexists with the ossification of the epiphyses. Bouchut<sup>1</sup> has recently shown that a phlegmonous form of periostitis may occur spontaneously in young infants; wherefore, it is fair to assume that we may have the same process in the ends of the shafts, and extending into the epiphyses. In the simple form of epiphysal separation there is sometimes a history of traumatism; it may result from exposure to cold, and has been known to occur in much debilitated subjects; it may be confined to one bone, or, though rarely, involve several. In syphilis, as the lesion is in most cases evidence of a severe form, there are usually other lesions or symptoms which indicate that disease; there is no history of traumatism, or of cold, but in all probability an implication of other bones, which latter may be affected in various degrees. Thus, perhaps, on another shaft the morbid process has simply reached the stage of enlargement; but, in addition, there may exist such osseous lesions as nodes and phalangeal enlargements which would positively indicate syphilis. Besides all these there is the age of the child, which we have already seen to be an evidence of so much importance. The course of the morbid process, when of a non-specific origin, presents certain characteristic particulars. Thus pain of an acute character referrible to the joint is felt at the outset, redness and swelling soon supervene, and symptoms of severe systemic reaction follow. These symptoms are always much more pronounced in the simple than in the specific form, going on even to the

<sup>1</sup> De la périostite phlegmoneuse aiguë chez les enfants. Gazette des Hôpitaux, 20, 21, 1874.

development of a typhoidal condition, which sometimes results in death. Then, again, after the redness and swelling have appeared, which are usually not so clearly limited to the epiphysal region as in the syphilitic form, evidence of implication of the lymphatics is soon seen in red, elevated, and painful lines extending up the limb. In fact, in this trouble we have an inflammation of the greatest severity, attended with the most formidable symptoms. There are, of course, cases which are of a milder character. Let us contrast this condition with that of syphilis, bearing in mind, as usual, the difference of age. Thus we have seen that even when the process was of the most aggravated type, the systemic reaction was not in proportion to the activity of the lesion; in fact, this point is not only significant, but also somewhat surprising. Though redness and swelling supervene, these features are somewhat less pronounced than in the other form. There is a greater tendency to a localization of the morbid processes to the original focus; there is usually no lymphangitis; and, as far as can be learned by observation, the pain is not as great as might be expected. These, then, are the distinguishing guides in severe instances. Now, then, my cases show that there may be a total separation of the parts, and yet the visible signs and symptoms may be of a mild character. Thus, the swelling occurs slowly; the separation coincidently with it; and, though an abscess occurs under the skin, it is not accompanied with very much heat or redness, which, besides, are quite sharply localized; finally, there is scarcely any evidence of implication of the system, which may not be in any degree affected. If we reflect on the nature of the changes, we may arrive at a reasonable explanation. Thus, in syphilis, the separation is due to a softening down of immature cells, and the subsequent symptoms result from the cutting off of the blood supply; whereas, in the simple form, the process is inflammatory from the commencement. In the milder form also there will be a history of syphilis, in addition to which, other lesions, of an undoubted character, may coexist, leading to a correct diagnosis. Wherefore, I think that if a given case is carefully studied, both in itself, and in its concomitant lesions and circumstances, mistakes of diagnosis may be avoided. The main points of assistance are: first, the age of the patient; second, the previous history; third, the

coexistent symptoms and lesions; and, fourth, the dissimilarity in the course of the two affections; the violent phlegmasic character of the simple form, and the comparatively subacute character of the syphilitic. Perhaps the fact of the perceptible thickening of the periosteum of the shaft above the epiphysis may be a point of assistance as settling a syphilitic origin. If a case of this kind was seen after separation had occurred, a diagnosis of fracture might possibly be made; but the absence of injury, and the fact that swelling had existed prior to the separation, the probable existence of other bone lesions, and the history of the case, taken together ought certainly to prevent that error.

*Diagnosis of the Enlargement of the Phalanges and of the other Bones of the Hands and Feet.*

In infants and young children, the phalanges are sometimes observed to be very much enlarged, and inquiry into the history of the case fails to elicit that syphilis is the cause. The clinical features of these swellings are similar to those of the syphilitic enlargements described in chapter nine. Indeed in their development, course and decline, these non-specific enlargements are similar to those of syphilis; and, after careful comparative study of these cases, I must confess that there are almost no distinguishing points; so that we are forced to rely upon the previous history and upon coexistent lesions or their sequelæ. Some of these cases may present no difficulties, owing to the presence of other bone lesions undoubtedly syphilitic. However, during the years in which I have been studying these syphilitic osseous lesions, I have met with a number of cases of enlargement of the phalanges in which no history of syphilis was obtained, and which I am convinced were not syphilitic. In several of these cases I have found an extremely debilitated condition of the system, due sometimes to poverty and want of care; in others to the depressing influence of a past attack of the exanthemata or of diphtheria. In these cases that concatenation of lesions and symptoms which is called scrofula was present—a condition which, when succinctly stated, may be described as a tendency to local congestion and abnormal cell proliferation in various organs and tissues. As results of my own study and observations, I am led to the opinion that

in this condition hyperplastic processes may occur in bone; for as the natural morphological changes in that structure are usually active, under the influence of this dyscrasia they become abnormally so, and induce enlargements of the bones. The lesion in such cases is an osteitis and periostitis, and is much less amenable to treatment than the syphilitic variety. The enlargements we are speaking of may be the result of traumatism even in a healthy subject. It is necessary to bring these points prominently forward, as there has been a tendency of late to class all cases of enlargement of the phalanges in children as syphilitic. If, then, in a given case, upon careful inquiry into the history of the mother and of the child, and after a thorough examination of the latter, no evidence of syphilis is obtained, the suspicion of that disease should at once be rejected. The features which point to syphilis, besides the history and concomitant symptoms, are the somewhat gradual and painless enlarging of the bone, the absence of any joint complication, and the fact that necrotic processes, if they complicate the case, are developed after the swelling has attained its maximum size—that is, rather late. In cases of traumatism, pain, and consequent uneasiness of the child, may be noticed, while the necrotic change appears earlier. In the variety of swelling due to the depraved condition of the system above spoken of, I have sometimes noticed that the enlargements occur rather more rapidly than in syphilis; that they are more liable to undergo a rapidly destructive change; and that they more frequently involve the joints. But, as I have before stated, these distinctions are far from being absolutely reliable, and in any case the diagnosis hinges upon the history and concomitant symptoms and lesions. It will be remembered that in the descriptive part I pointed out that the hyperæmic condition of the integument of the fingers, in cases in which excessive pressure is exerted by the bony swelling, was sometimes accompanied with a coppery appearance of the member, yet as this peculiarity is infrequent, and as it is simulated by simple chronic congestion, we cannot attach much importance to it.

As we sometimes see rheumatoid arthritis even in young children, though not in infants, it is well to state the points of distinction between its lesions and those of syphilis. This

disease is usually attended with well-marked fever; the joints, particularly the large ones, are affected, and if the fingers are involved, it will be found that the enlargements of the phalanges are greatest at the joints, which are affected much more profoundly than in syphilis. The main points of distinction are: the antecedent symptoms, the great pain, the localized intensity of the inflammation, with consequent swelling, which, as stated, are first limited principally to the joints. These points, as contracted with dactylitis syphilitica, are so well characterized as to prevent any error in the diagnosis.

Little need be said of the enlargements of the phalanges produced by exostoses and enchondromata, as their size, localization, and history, are usually such as to clearly suggest their nature.

A perusal of the case, given in a foot-note to chapter xv., will give a sufficient idea of the appearances presented by the phalanges, when the seat of cartilaginous hyperplasia. This condition begins necessarily in *utero*, is localized to one, or perhaps two bones, and discoverable at birth. Being unattended with inflammatory symptoms, the phalanx will, upon inspection, appear translucent. The condition is very rare, as the case detailed in the note is the only one which I have seen, or indeed, read of.

The diagnosis of the swellings of the carpal and metacarpal bones, and the corresponding bones of the feet, depends largely upon the history of the case. In these swellings joint complications are rather more frequently observed; in which event the general redness and swelling might mislead the surgeon into the belief that those structures were the focus of the inflammation; but inquiry into the history of the case, and a careful examination of it, would undoubtedly lead to more correct conclusions. It is necessary to bear in mind that these swellings may arise from the same condition which produces the phalangeal enlargements, and also that they may be the result of traumatism; but here also articular complications are rather more liable to occur; indeed, in many instances the morbid processes begin in the structures which compose the joints. However, to render the matter certain, the history of the case, and its concomitant features, must be thoroughly looked into, by which course only a correct conclusion can be arrived at.



*The Diagnosis of Nodes on the Cranial Bones.*

The swellings upon the cranial bones, in like manner, present several points of interest in diagnosis. The small variety of node described by Wegner, consisting as it does of minute oval or round elevations, exists thus far only as a pathological rarity, and is not simulated by any other affection. Therefore, if met with, it can be unequivocally ascribed to syphilis. In the larger variety, in which the swellings develop to a considerable extent, they might perhaps be regarded, when in an indolent and uninflamed condition, as sebaceous tumors, which are deeply seated, and have become attached to the pericranium. But, besides that in the young child this peculiar condition of the wen is very rarely if ever met with, there would be the absence of any other symptom or lesion to cause a suspicion of syphilis, and the sebaceous tumor, if carefully examined, would be found in many, perhaps the majority, of instances, soft upon pressure, rounder, and more abrupt at the edges, than the node. The situation may likewise assist to guide us, as nodes are seated generally toward the lateral parts of the frontal, and upon the parietal bones. We have seen, in the clinical part, that in several cases inflammatory complications rapidly supervened. In these the general appearances and symptoms were those of phlegmonous inflammation of the subcutaneous tissue of the scalp. So that we have reason for suspecting nodes which have undergone degeneration, in the event of meeting with such abscesses on the heads of syphilitic children. But these are the facts which help us. The node is deeply seated, and may be attended in its evolution with pain, and generally enlarges gradually; points which, once ascertained, there is no longer likelihood of mistake. But in those instances already alluded to, in which a rapidly destructive condition of the bones early complicates the case, the diagnosis will remain doubtful until after an incision is made in the part, when the nature and extent of the condition can be ascertained. The depth and perhaps the occurrence of bony sequestra will then be determining points. A history of syphilis or the existence of its lesions may assist. These cases require care in their diagnosis. When the node runs a chronic course, is fully developed, and then, afterwards, undergoes necrotic change, with its concomitant

symptoms, usually no difficulty will be experienced in arriving at a conclusion; but, as I have said before, doubt will more usually arise in those cases in which the necrotic tendency begins with the development of the tumor. There is a point of considerable importance in diagnosis which deserves mention; it is this, in rare instances wens undergo ulceration of a persistent character, which involves the tissues around in inflammation, is only cured by its enucleation, and might be mistaken for an ulcerating gumma of bone and integument. Should such a condition obtain in the infant, one, however, that we can hardly expect, it is easy to see how it might, from its being deep-seated and chronic in character, be looked upon as an instance of the inflammatory node.

I once saw in a typical case of rickets, in which, unquestionably, there was no syphilitic complication, a state of the skull bones which struck me at the time as being very likely to be regarded as syphilitic. The patient was a child eighteen months old, who at its sixth month had the usual symptoms of rickets, with swellings at the distal ends of the ribs and of the radii and ulnæ. It had continued in a miserable condition of health, and at its ninth month a swelling was found on the left side of the frontal bone, just outside the eminence; this increased, and was followed by a similar swelling on the right side, at its fourteenth month. When first seen by me, the left or first swelling was elevated above the plane of the bone about three-quarters of a line; it was oval in shape, having a flat, smooth surface, and being an inch and a half long, by three-quarters of an inch wide. On the right side was a swelling precisely similar, except as to size, which was but one-half that of the other. These swellings differ strikingly from the typical nodes, but still they are exceptional as occurring in rickets; and indeed I cannot find such an instance mentioned. The lesion<sup>1</sup> was simply a thickening of the

<sup>1</sup> This was undoubtedly an instance of that abnormal periosteal osteogenesis which is caused by rickets. It consists in an excessive development of the young connective tissue, and a corresponding increase in the number of the capillaries. Such swellings may be found upon the surfaces of the bones generally, and are to be remembered in questions of diagnosis. When occurring on the cranial bones, they are, according to Rindfleisch (*A Manual of Pathological Histology*, Vol. 2, London, 1873), usually sharply circumscribed as in the case in the text, differing from those upon other bones, where they usually are not thus limited.

periosteum, and was caused by the rachitic blood disorder. We not unfrequently find thickening of the periosteum in rickets near the sutural margins, but, as I have said, not usually in the situation here spoken of. It is well, therefore, to bear in mind, in making our diagnosis, the probable existence of this form of flat, broad rachitic<sup>1</sup> swelling of the skull, as a precaution against error

#### XXVI.—THE TREATMENT.

We now come to treatment. Though perhaps foreign to the present investigation, it may be well to briefly mention the beneficial results of a proper and well-regulated mercurial treatment of a pregnant woman, in preventing the future development of syphilitic lesions in her child. My own cases clearly indicate that the neglect of treatment of the malady in the parent has resulted in her bringing forth a tainted offspring,

<sup>1</sup> These rachitic periosteal thickenings of the cranial bones, as well as their resulting enlargement, are particularly to be borne in mind in making a diagnosis between rickets and syphilis. In the case just mentioned the tissue was undoubtedly still unossified, and it is fair to suppose that on the completion of the ossific process, a deformity, misleading in its appearances, would result. I saw this condition in its developed state in a patient, whose lesions were such, that doubt was entertained by several as to their etiology. Its importance therefore warrants its insertion in this connection. The patient was a girl fourteen years old, who, in early life, suffered severely from rickets, and whose frame was thereby much distorted. She was under my treatment for several years, for a very extensive lupus vulgaris of the face. She also had upon the right lateral portion of the frontal bone a swelling having an area of an inch and a quarter, and being about half an inch high. It was perfectly smooth, and its margins sloped imperceptibly into the surrounding bones. The case was seen by many physicians; by some of whom it was thought that the association of the cutaneous and osseous lesions was an evidence of hereditary syphilis, though there was no history of that disease; others argued that, as lupus was an undoubted evidence of scrofula, therefore the osseous lesion was the result of that disease. Should the last hypothesis be accepted, we should come to look upon nodes as lesions of scrofula, an opinion not tenable. Now, inquiry into the chronology of the affections and a knowledge of the lesions of the cranial bones, which rickets produces, clears up the case conclusively. Thus, in her early infancy, the girl had rickets affecting the osseous system generally, at which time the peculiar hyperplasia of the periosteum, which that disease induces, occurred on the frontal bone. The cell proliferation being active, a large swelling resulted, which, later on, became ossified, and proceeding in growth with the cranium remained permanent. The lupus, which developed several years later, was probably the expression of the debilitated state of health.

one in which, perhaps, are developed severe osseous and other lesions. Wherefore, as a prophylactic consideration, this matter deserves especial attention.

Let us now consider, with brevity, the indications for the treatment of infants hereditarily syphilitic affected with osseous lesions. We have already seen, in studying their pathological anatomy, that they are essentially cellular hyperplasia of the forming bone, and of the periosteum, produced by a recent acute syphilitic action. This state differs, in being more advanced, from that of cases in which such bony lesions are absent; and thus, while we have to treat a recent syphilitic condition, we have superadded the lesions already alluded to. A superficial knowledge of these cases might lead to the opinion that children thus affected had lesions of a tertiary character, as they are of bone, and hence that they required the treatment usually employed in that stage; but, as I have, I think, clearly shown, these lesions are of a different character from gummy tumor proliferation, being less advanced, and more closely allied to simple cell proliferation. The condition, as warranted by pathology, can be rightly compared with that of the late adult acquired syphilis in which gummy tumor proliferation has not yet appeared. Now, in this stage, it is well-known that the combined or mixed treatment of mercury and iodide of potassium is much more efficacious than is either of those medicines administered alone. And my experience in the treatment of these osseous lesions is that the infant should be treated by the same remedies, and on the same principle. The prescription which I have used, and which I see no reason to modify, is as follows:

R Hydrarg. bichlor . . . . . gr. i.  
 Potassii iodidi . . . . . ʒ iv.  
 Syrupi anrant.,  
 Aquæ, āā . . . . . ʒ ij.  
 M.

We may also use the bin-iodide instead of the bichloride. The dose of this mixture, for a young child about two months old, is five drops, which should be gradually increased, in the manner recorded in the cases. I have pushed this remedy as high as twenty drops in some cases of severe hereditary syphilitic lesions. A matter important to be borne in mind is, that

as the taking of medicine has of necessity to extend over a long period of time, we must use such a remedy as is not likely to derange the gastro-intestinal functions, or will induce cachexia, but which, yet, will be sufficiently powerful to control the disease. These indications are, I think, fully met by the prescription above given. Fears may perhaps be entertained by the practitioner, that this long-continued treatment might result injuriously to the health of the child; but such are entirely without foundation. It will be found that under the influence of the mixture alone, even without the simultaneous administration of tonics, the health of the infant will be greatly improved, sometimes in a very striking manner. There need be no apprehensions of salivation, or of any noxious effect of the mercury; for when this combination is used, the iodide of potassium corrects such a tendency, and this constitutes another advantage in its favor. There is good reason for believing that the power of the mercurial, in such a protracted course of treatment, will, after a time, from the system becoming habituated to its action, fail of the desired specific effect. This also occurs in adult syphilis, and is to be successfully met by discontinuing the treatment for a short period, several times during the course. In this interval of rest, the system becomes again subject to the mercurial influence, and its action is again made manifest. I have omitted to mention, in my remarks upon treatment, the propriety of ordering these intermissions, though regarding them as essential; for the reason that very frequently they occur in the cases of these children by the negligence and sometimes the indifference of the parents. The practitioner will sometimes undoubtedly encounter great difficulty in enforcing regularity in the treatment, and periods in which the medicine is not given, and perhaps forgotten, will certainly occur, even among intelligent people.

Cases may be met with in which the assimilative processes of the child are imperfectly performed, as well also as instances in which the digestion is slow, and attended with an acid condition of the stomach. Under such circumstances a proper preparatory treatment, the nature of which will be indicated by the peculiarities of the case, is necessary, in order that the medicine shall be well borne, and that benefit shall result from it.

It is of importance also to advert to the necessity of a well-regulated and sufficient diet during the period in which specific medication is followed. In order that good should be produced, and to avoid cachexia, plenty of nourishing food should be given, otherwise the action of the medicine is lowering to the economy, even to the point of being harmful. This remark applies with equal force to the treatment of all forms of hereditary syphilitic lesions, as it does also to the adult. In the treatment of cases among the poorer classes, a want of food will often be found to be a serious obstacle to success. It is unnecessary to go fully into a consideration of the forms of diet required; for it is a well-known fact that the mother's milk, if of a good quality, and of sufficient quantity, is the best food obtainable; or, in default of this, that of a wet-nurse;<sup>1</sup> or, again, a good quality of cows' milk. In addition, much good may be obtained from the administration of cod-liver oil in full doses; preparations of iron and quinine will also be found in many cases beneficial, and in some essential.

I have used the hypodermic injections of corrosive sublimate in hereditary syphilis, and coincidentally given the iodide internally, but, from a no inconsiderable experience, would advise that this treatment should not be used. These injections induce great subcutaneous infiltration and inflammation, and are very frequently followed by abscesses. I have seen severe systemic reaction follow them, even when used with caution, independent of which objection they are almost inadmissible by reason of the pain they induce, and the repugnance they excite in the minds of the parents. In fact, I think that for infants they are a cruel method of treatment, and that they should scarcely ever be employed. There may be cases in which the

<sup>1</sup> It would be improper to pass over this point without careful consideration. There is, as is well known, a very great liability that a syphilitic child may convey syphilis to any healthy woman who nurses it at the breast; consequently, under no circumstances would it be right to expose such a person to that serious risk. Though the child might not have, when examined, lesions of the mouth, there is a probability that such might develop; or, again, as its blood possesses contagious properties, this also might be the means of conveying the disease. As to the propriety of suckling it by a syphilitic woman, whose milk may appear to be of good quality and sufficient in quantity, if by such a better nourishment can be given than by its mother, it may have that; but in such cases cows' milk is really the best diet.

course of the osseous lesions is so rapid, that we wish to induce the effect of the remedy immediately, in which event we may have, of necessity, to use them; but I should strongly advise their discontinuance just as soon as the urgent indications have passed away.

Much has been said of the value of mercurial inunctions as a speedy and certain way of inducing the effects of the mineral. They are, in many instances, of infinite value in adult acquired syphilis; but in that of infants are apt to produce severe cutaneous inflammation, and sometimes grave systemic disturbance, such as great enfeeblement, impoverishment of the blood, with cachexia. For these reasons, and also because in these cases their use is to be extended over such a long period, and that it is almost impossible to get the attendants to use them intelligently and regularly, I am not disposed to advise them, notwithstanding their great potency as used in the adult.

As to the method of continuing the use of the mixed treatment, I should advise the reader to follow the history of several of the cases, as such a perusal will give a more practical idea than any didactic statement can possibly convey. In summer, gastrointestinal disorders may supervene, in which case the hydrargyrum cum creta, with astringents, can be given, and perhaps the iodide continued. During the continuance of warm weather, it is well to anticipate these frequently-occurring troubles, and prudent to send the little patient into the country. Another point is, that if the mother is able, she should continue to give the child the breast, as in that case it is less liable to bowel difficulties. I say nothing of medication of the child through the mother, as it is totally ineffectual.

Locally, in the case of the ulcerations, I think that nothing is as beneficial as the application of iodoform into their cavities, with a covering to the other parts of balsam of Peru ointment.

When separation of the epiphyses occurs, the indications are the same as in fracture, namely, immobility of the parts by means of an accurately fitting splint, or a bandage. Adhesive plaster, plaster-of-Paris, and the starch bandage, may severally be made use of. The adhesive plaster, if properly applied, is, perhaps, the best, as it is readily removed, easily reapplied, and adjusted as the swelling diminishes. It is very necessary not only to keep the parts in juxtaposition, but also to main-

tain pressure, which is as beneficial in these cases as it is in synovitis. When the latter complication arises, rest should be insisted upon, and cooling lotions applied, in addition to such medicinal treatment as the disease requires. Surgical interference may be demanded when the epiphysis is wholly separated, which then acts as a foreign body. In such an instance, the removal of the fragment, the application of carbolized lint in the cavity, and the maintenance of a fixed position, are the main indications.

It may happen, in case of enlargement of the phalanges, that the medicine has no effect, and that the swelling persists. In such an event the surgeon might, perhaps, think of resorting to exsection, a proceeding which, in my opinion, should be delayed as long as possible. Indeed, I think that the mercurial preparation should be persevered with for eight or ten months, while at the same time pressure is made use of. Even in case of failure, there is no good reason for removal of the bone if it be simply in a swollen condition. Should, however, necrotic changes supervene, together with sinuses, and the usual chronic inflammatory condition, perhaps an operation would be imperative; but I should strongly counsel delay, and a perseverance with treatment.

In cases of enlargement of the phalanges, or of either of the ends of the shaft, when ulceration does not complicate the case, benefit can be obtained by slight continuous pressure, combined with the constant application of a mercurial preparation, either in the shape of the ointment, which should be half of the officinal strength, or of a mercurial plaster, either of the simple variety, or the *Emplastrum de Vigo*. When such an application is made, care should be exercised that inflammation of the skin is not produced, as ulceration of a chronic character might result. At any rate, the plaster or ointment, kept in close position by a bandage, should be frequently changed, as it becomes loose in a few days.

The nodes on the scalp require, in the uncomplicated condition, little or no local treatment, beyond daily frictions with mercurial ointment. When they degenerate into abscess, and consequently induce a phlegmonous state of the scalp, a free crucial incision should be made, the detritus carefully removed, and the whole thoroughly mopped with carbolic acid rendered fluid by a few drops of water; the cavity then to be



stuffed with charpie, and cold-water dressing applied to the scalp. The next day this should be removed, and if the parts present a sloughy appearance, the application of the carbolic acid should be repeated, taking care to merely moisten the surface, and not to allow any of the acid to flow from the wound. Or, the cavity can be dusted with iodoform, and then stuffed with lint, and a cooling lotion applied to the spot, and to the scalp for some distance beyond it, as long as any inflammatory symptoms remain. This latter application is of much importance, as such phlegmonous inflammations of the scalp very often give rise to adenitis of the post-cervical ganglia, which in syphilitic subjects are particularly liable to suppuration. These directions as to treatment of bony abscesses about the scalp apply equally to those developed in other parts.

Such, therefore, are the main outlines of treatment, which will be found to meet the principal indications. Some minor points may arise and demand treatment, for which the practitioner will find a sufficient guide in general principles.

XXVII.—THE SWELLINGS WHICH OCCUR LATER IN THE LIFE OF THOSE HEREDITARILY SYPHILITIC, AT THE JUNCTION OF THE DIAPHYSES WITH THE EPIPHYSES.

In connection with our study of these diaphyso-epiphysal swellings in hereditarily syphilitic infants, it is appropriate to call attention to some observations made by Furneaux Jordan upon somewhat similar lesions developed in later periods of life in victims of hereditary syphilis.<sup>1</sup> This surgeon reports a number of cases in which enlargements occurred at the lower ends of the femur, humerus, radius, as also at the great trochanter, on the ilium, and at the upper end of the humerus. These swellings ran an indolent course, attended with but slight pain, and while in some instances they had led to sclerosis of the bones, in others caries occurred, and dermal sinuses were formed; in some instances a secondary synovitis was induced. This author thinks that when the humerus, radius, or ulna are affected, the joint complication comes on sooner than when the

<sup>1</sup> On the Hereditarily Syphilitic Character of an Inflammation of the Bones hitherto regarded as Strumous.—*Medical Times and Gazette*, March 16th and 23d, 1867.

larger bones of the leg are the seat of swelling. Sometimes, though rarely, he found synovitis of the knee-joint the first evidence that enlargement had occurred in the femur. In one-third of his cases (he reports fifteen), the upper end of the shaft of the femur was attacked, the lesion being limited to the base of the great trochanter, while the head and neck of the bone remained unaffected. In one instance he found such a swelling at the internal condyle of the humerus, a situation which we, in our studies, have found to be much prone to syphilitic swellings in infants. In the one case, in which the ilium was involved, he satisfied himself that the inflammation was on the dorsum, and that its crest, with its separate centre of ossification, was free. Mr. Jordan ventures the suggestion that caries of the vertebræ coming on late in adult life is mostly, if not always, due to hereditary syphilis.

As regards the intensity of the morbid process, there is considerable variation; in some cases the osteitis is very slight, in others it produces sclerosis, while in the worst form caries is induced. Necrosis is not a result of this lesion, according to this author. Its chronicity, however, is worthy of mention; since, in one instance, a sinus remained open for eleven years, in another, as long as twenty. But while in those instances in which degeneration occurs we may observe this extreme chronicity, there are, Jordan is of opinion, cases so slight as sometimes to escape detection, while others are observed, particularly in dispensary practice, in which the patient complains of stiffness of the wrist, elbow, or ankle, or of a larger joint, and perhaps impairment of motion, either in extension or flexion, pronation or supination. In these instances an enlargement of the distal extremities of the bone or bones is found to be the cause. In the majority of these cases Mr. Jordan thinks that in hereditary syphilis is to be found the origin of the trouble. As already said, the greater or less immunity of joint complication depends upon two facts; first, the chronicity and severity of the inflammation, and secondly, as to the size of the epiphysis; for, if long, the inflammation naturally is more remote from the joint, but if short, it runs its course near the joint, which is very liable to be implicated with it. It will be seen that, in my own observations upon joint complications secondary to diaphyseal swellings, this fact was clearly brought out by

several of my cases, and was also explained in my comments thereon.

The focus of this osteitis, which, from inference, I should consider as simply inflammatory, and not attended with gummy tumor or granulation tissue proliferation, is at the end of the shaft in the cancellous tissue. According to Mr. Jordan, the inflammatory process is greatest in the shaft, and may or may not involve the epiphysis. Being developed at a time when the changes of the cartilage are less active than in the earliest periods of life, it is very probable, as suggested by Jordan, that the epiphyses are scarcely, if at all, affected; hence, that the lesion is an osteitis rather than an osteo-chondritis.

The ages at which he has noticed this trouble are between the fifteenth and thirty-fifth years of life, and even as late as the fortieth. The illustrative cases are open to the same objections that many cases of supposed hereditary syphilis are subject to, namely, that the hereditary syphilitic diathesis is assumed from the existence of the remains or sequelæ of lesions which are thought to be of syphilitic origin, and are considered as not being produced by any other condition of the system. This fact is to be sincerely regretted; since, in drawing such important conclusions as these cases suggest, it is very essential to establish beyond a shadow of a doubt the influence of syphilis as the cause of the lesions. Yet I think that many of Mr. Jordan's cases will warrant the suspicion, I may even say the diagnosis, of syphilis, for which reason his conclusions, which he states in a very modest way, are certainly of great value. They are suggestive rather than conclusive; yet open out to us a field of study which should be carefully examined, for by drawing true conclusions in these cases we are prepared to undertake their treatment in a more definite or intelligent way, and rescue such cases from that great gulf of ignorance which we unfortunately call scrofula. Another point of very great importance is adduced by Mr. Jordan in these cases, which is, that mercury exercises upon them a beneficial effect. This fact may be in favor of the syphilitic origin of the lesions, and should, therefore, be borne in mind.

Since we have found that in the early infancy of syphilitic children this peculiar part of the bones is liable to undergo in-

flammation, when we consider how active the natural changes are at this point, and that they remain thus for such a number of years, it certainly seems very probable that it should be affected later in the life of the syphilitic individual, as well as in its early life, particularly as in the majority of cases it is a lesion consisting in perverted nutrition.

During the past summer I have had under my observation a patient sent to me by my friend, Dr. Gibney, in whom the peculiar osseous lesions described by Jordan are manifested. The case is that of a German girl, eight years of age, who presents a clear history of syphilis, which was acquired at her third year. Shortly after, having a typical rash and condylomata, she was attacked with severe pains in the bones, recurring especially severe at night. When the child was five years old, having been in the meantime sickly, it was noticed that some of her bones swelled near the joints. The swelling increased slowly, until enlargements of considerable size were produced. Though treated by various practitioners for a long time, no diminution was observed. When first seen by me, late in May of 1874, I found that the index and middle fingers of the left hand were slightly enlarged, that the distal diaphyso-epiphysal junction of the radius and ulna in each arm was manifestly swollen, and that a similar condition existed at the lower extremities of the femora. I tried iodide of potassium in increasing doses, combined with iron and quinine, with the result of relieving the nocturnal pain, which was severe and continuous. This failing to reduce the swelling, I used the mixed treatment, according to the formula already given, administering half-teaspoonful doses. As thus far observed, in a trial of two months, the effect is very gratifying, as there is a perceptible decrease in the size of the swellings, and much more suppleness and mobility of the limbs, particularly the lower: moreover, the general health has materially improved. It must be borne in mind that, in cases where the swellings have existed, as here stated, so long, the chances of the ultimate restoration of the parts are not very great, as the bones have then passed into a sclerotic condition, difficult if not impossible to be removed. This remark applies with equal force to any form of syphilitic bone lesion. Therefore, we cannot say definitely, in any such chronic case in which anti-syphilitic

treatment is not absolutely successful, that this fact militates against the correctness of the diagnosis.

It may be well to state in reference to this case that, though the child is younger than any of those spoken of by Jordan, nevertheless I am disposed to think that the lesion was an osteitis of the end of the shaft rather than an osteo-chondritis. The peculiar character of the case supports this view. Thus the swellings occurred at the period when osteitis is to be expected; they grew much more slowly than those of infancy, and did not attain such a relatively large size as when the cartilaginous segments are mainly implicated. There was, besides, an evidence, in the tapering condition of the bones, that the process had extended a short distance up the shaft, thus seeming to show that it had originated in it. This case would favor the view that this condition can be developed at an earlier period than is stated by Jordan, and there is no anatomical reason why it should not.

Another important consideration is, the occurrence of this lesion in acquired syphilis. This, together with the fact that the true osteo-chondritis may be the result of this form of disease, as in my eighth case, in which the existence of that lesion is clearly shown, go to prove that the bones are affected similarly in both the hereditary and acquired syphilis of children. Added to this, we know that in both of these varieties of syphilis, gummos proliferation may also be developed in a similar manner. Thus, there is ample evidence adduced to warrant the general statement that the osseous lesions in infants and older children are similar in nature and character, whether resulting from hereditary or acquired syphilis. This knowledge is very important; for while the hereditary osseous lesions have hitherto been slightly and incorrectly understood, there was scarcely anything known of the osseous lesions of acquired syphilis in children; indeed, the fact of their occurrence has hardly ever been mentioned.

XXVIII.—THE COURSE OF THE GUMMOUS OSSEOUS LESIONS OF  
OLDER CHILDREN, CONTRASTED WITH THE LESIONS OF IN-  
FANCY.

It has been shown in the clinical division of this work, and also in the pathological part, that the osseous lesions produced

by hereditary syphilis in the infant differ somewhat in nature, course, and features, from those of later life. Space will not permit me to describe the lesions of more advanced years in an exhaustive manner in this work; but for the sake of completeness I have thought it best to give a general idea of them, as supplementary to the description already given. To this end I have selected from my notes the following case, as it will show somewhat fully the points of contrast:

The patient was a German boy, Henry Schwartz, who was first seen by me in 1871, he being then a little over nine years of age. Being accompanied by his mother, he came to the college in February, having been sent by one of my friends, who was his teacher. His mother bore evidences of a severe form of syphilis, in the fall of the nasal arch, in a nasal twang with which she spoke, owing to loss of tissue in the palatal region. She also had deep cicatrices at the side of the nose, running up the left ala. Her husband had suffered from syphilis, and had died of a nervous affection which was ushered in by hemiplegia. Prior to the birth of the present child the mother had had two miscarriages, late in pregnancy. Shortly after his birth he had severe syphilitic manifestations. He remained sickly, weak, and delicate, until he was five years of age, during which period he was irregularly and, as I learned, not properly treated with mercurials. When about five and a half years of age he was afflicted with a series of bony swellings, which troubled him for two years.

When first examined by me I found the following abnormalities of the osseous system: On the right hand, the index finger was a mere stump, just reaching to the first phalangeal joint of the middle finger. When I had carefully manipulated the parts, I found that the whole of the first phalanx, the proximal third of the second, and the distal third of its metacarpal bone, had been absorbed. The latter bone tapered off gradually to its end, at which point a band, undoubtedly of fibrous tissue, was attached, which, at its other end, held the remains of the second phalanx. This fibrous band could be distinctly felt, and it was found to allow of slight extension when traction was exerted upon the end of the finger. It answered, in a measure, the purpose of joint structures, and allowed the finger to be bent to an abnormal degree, in all directions. Very

slight voluntary motion was present, and the grasp with this finger was not firm. There was not as much redundancy of integument as might have been expected, there being, however, a large fold at the base of the finger. The remaining bones of this member were unnaturally small and thin, and the nail was very small and curved. There was no trace of cicatrix about the parts. The little finger of this hand reached to the first phalangeal joint of the ring-finger, but all of the phalanges were perfect, and the shortening was found to be due to the loss of one-half of the corresponding metacarpal bone. A similar fibrous band held the bones together, but there was not such extensive preternatural mobility of this finger as there was of the index.

Similar changes were also found upon the left hand. The first phalanx of the thumb had disappeared, and the second abutted against the end of the metacarpal bone, which seemed enlarged and bulbous. The same condition of mobility existed as was found in the right index finger. In the middle finger the second phalanx was found to be wanting, and the first and third were joined together with fibrous tissue. An attenuated condition of these bones was also found, but they were slightly enlarged at their approximating ends. There was unnatural mobility of the parts, and the power of the grasp was destroyed. Besides these alterations there was a loss of nearly an inch of the distal end of the left radius, and of fully an inch and a half of the right ulna. These bones ended by conical-shaped extremities. There was surprisingly little disturbance of the motions of the forearm induced by this loss of bone. In the region thus affected the integument appeared normal. These latter affections had appeared six months after the swelling of the phalanges. The boy had also had nodes on the ulna and on both tibiae, while on the latter slight depressions in the bones resulting therefrom might be felt. There were, also, large depressed cicatrices upon the anterior surfaces of the legs.

The swellings on the tibiae and ulna began when the boy was about five years of age. They were preceded by pain, which, though at some periods worse at night, at others was severe during the whole day. They grew slowly and gradually larger, until they were perceptibly prominent; during the whole

period being the seat of pain. In a year they reached their maximum size, and during the two following years, under an irregular treatment, they more slowly subsided ; until, in the end, those on the tibiæ were replaced by depressions.

Six months after the swellings on the extremities had appeared, the bones of the hands were observed to enlarge slowly, there being also severe pain, similar in character to that in the nodes. In rather more than a year, the hands were very much disfigured by the enlargement of the bones, their movements being much interfered with. The affected fingers were found to be movable only with difficulty, and, when the others were flexed on the palm, remained extended. They would yield, however, to artificial motions. The joints were said to be the seat of greater swelling than any other part of the fingers, and the mother stated that at one time the tissues over them were red, inflamed, and painful. These members then remained more than a year in this indolent swollen state, and then gradually began to grow smaller. The process of attenuation occupied rather more than a year, and, finally, resulted in the conditions described as found by me. After careful inquiry I elicited the fact that, though pain of severe form existed during the period of the increase of size of the bones, when they reached the greatest extent of enlargement, and during the period of subsidence, it was of a mild form, and sometimes not at all present. During these years the general health of the child had been quite bad, and he had an affection of the left eye, undoubtedly a keratitis which had left a small opacity over one border of the pupil. He had also suffered severely with frequently recurring pulmonary troubles.

Let us now merely study the bone-lesions. It is an undoubted fact, proved not only by the history of the case, and by its state of evolution, but also by the co-existence of gummatous ulcers in the subcutaneous connective tissue, that the nature of the osseous lesions was of the gummy tumor variety. Hence the case is interesting, as showing, in a typical manner, the evolution and decline of these lesions. Occurring at a more advanced age, and at a corresponding stage in hereditary syphilis, they attack both long and short bones. Under the periosteum and in the bone structure, this granulation tissue is slowly proliferated, the process occupying a long time. In the



neighborhood of joints, the tissues become thoroughly infiltrated with this morbid growth. An ephemeral hydrarthrosis then complicates the case, as recognised by its peculiar symptoms, this being the only evidence of inflammatory action observed, which we, appreciating the nature of the case, know is merely an epiphenomenon. Going on in this indolent manner, the bone becomes very much swollen, remains in that condition some months, and then this enlargement, in a similar slow manner, grows less, until, finally, portions of some bones, the whole of others, with their articular appendages, are totally absorbed. The disappearance of the joint structures shows undoubtedly that their substance was previously infiltrated. The integument may be inflamed by pressure, but usually the action is subacute. This gives, in the main, a clear idea of the course of the gummy osseous lesions. It may happen that degeneration complicates the case, when the same subacute indolent condition may also be noticed. This state, contrasted with that of infants, differs in the age at which the osseous lesions are developed, in the slowness of their course; those in infancy being more rapid, and in presenting greater evidence of inflammatory action, and involving the tissues and organs around and connected with them in a more acute morbid action. Then, in the stage of decline and in the sequelæ there are distinctive points; thus, in infancy if the bone remains permanently enlarged, still its size is less than when it is the seat of gummy degeneration; and, when subsidence does occur, it ceases when the normal size of the bone is reached, not usually going on to absorption in any marked degree. The joints are in some cases involved in active inflammation, but, at the decline of the morbid action, remain in their integrity, not having, as in the later affection, undergone absorption. Thus summed up succinctly, the syphilitic osseous lesions of infancy are attended with signs of a somewhat active inflammation, which reacts in a similar manner on those tissues which are near the bones; whereas the lesions of syphilis of more advanced life, run a very chronic course, being, as a rule, attended with symptoms of a subacute character; and while the former may result in some disfigurement or distortion of the bone, the latter are frequently followed by a greater or less total destruction of them.

## XXIX.—MISCELLANEOUS CLINICAL NOTES.

I was asked by my friend, Dr. S. H. Dessau, physician to the children's department of the New York Dispensary, on the 5th of June, 1874, to see a child which had been brought to his service for treatment, the mother alleging at the time that its affection was restlessness at night. It was first brought to the dispensary on the 22d of May, and was then two months old, consequently, being about ten weeks old when first seen by me. At this time I found the following lesions: There was a very copious, large papular syphilide over the face, crusts on the scalp, mucous patches in the mouth, and fissures at the labial commissures, while the child suffered much from coryza. There were a few papules around the buttocks which had not gone on to ulceration. At the distal extremity of each radius and ulna at the diaphyso-epiphysal junction, was a well-marked enlargement of the bones. The swelling began abruptly from the shafts, and, attaining a height of about half an inch, declined by ending in the epiphyses, which it enlarged, except at the carpal joints, where they appeared of the normal proportions. The swelling was of an intermediate condition between the ringed form of enlargement and that which involves the whole epiphysis, both of which forms have been already described. The surfaces of these swellings were perfectly smooth and not at all unequal, nor adherent to integument, which, not being stretched, was freely movable over the bones. There were also osseous lesions upon the hands; the first phalanx of the right index finger was enlarged to about double its size; the enlargement being quite even, and the bone having the shape of an acorn. The joints at either end of the bone were unaffected. The integument was not very much stretched, and was unaltered. The tapering of the finger was well marked. The index finger of the left hand was not as much swollen, and in every particular resembled that of the right hand. The left ring finger was enlarged in a somewhat greater degree than either of the two first described, and in all its characters resembled the other two. It was very evident that mild spontaneous pain existed in the swollen parts, as the child, which was generally good tempered, flinched from gentle manipulation, and cried piteously if the parts were thoroughly examined. My impres-

sion was that the bones were slightly painful, and I am of the opinion, as there are no other known reasons for the child's restlessness at night, that pain was present in the swellings. This, perhaps, was due to the fact that they were as yet in an advancing stage, and, consequently, still the seat of inflammation.

The mother stated that she noticed the swellings when the child was a month old, and that they were then as large as when I first saw them. The mixed treatment was administered, and local applications were used. On the 17th of July, the cutaneous and mucous lesions had disappeared, and all the swellings were markedly diminished in size. At this date, owing to the advancing cachexia, which was undoubtedly rendered more severe by the want of care and of proper and sufficient nourishment, cod-liver oil was ordered, in addition to the alterative. On the 19th of July, a severe and persistent diarrhœa set in, and the child was not seen again. It is supposed that it died, as the previous attendance of its mother had been, for a dispensary patient, exceptionally regular.

The chief value of this suggestive case is, I think, in the weight which it carries with it in favor of the view that the course of these lesions is attended with more or less pain. It is unnecessary to dwell any longer on this point, as it has received full attention in the chapter devoted to the consideration of that subject. In a diagnostic point of view, it is of interest as showing that the coexistence of diaphyso-epiphysal swellings with enlarged phalanges would clearly establish its syphilitic nature. The existence, moreover, of undoubted syphilitic lesions of the skin and mucous membrane would settle the question. An interesting point in treatment is suggested by the case, namely, the urgent necessity of sufficient and nourishing food during the period when mercury is being administered. The weight of this fact has already been considered.

Since that portion of this work which contains the cases of other observers was written, three cases of syphilitic osseous lesions in infants have been reported; two by <sup>1</sup>Parrot, and one by <sup>2</sup>Charrin. As they suggest no new points, being only confirmatory of such as have already been fully and carefully described by me, it is unnecessary to give even brief descriptions of them.

<sup>1</sup> *Gazette Médicale de Paris*, No. 44, 1873.

<sup>2</sup> *Gazette Médicale de Paris*, Nos. 31 and 34, 1873.

XXX.—CERTAIN NON-SPECIFIC AFFECTIONS OF THE BONES, SOMETIMES  
REGARDED AS SYPHILITIC.

As supplementary and even essential to the knowledge of the osseous lesions of syphilis in infants, it is necessary to consider, somewhat fully, a non-specific condition, already alluded to in a previous part of this treatise, which frequently predisposes to inflammation of the bones. By examining the distinguishing characters of which I hope to show the real nature of what is ordinarily and vaguely classed as scrofulous. Although it is generally conceded that there is a scrofulous affection of the bones, yet the knowledge of it is so very limited, that in no text book is it described with any degree of clearness; affections of the bones when not presenting the features of rachitis are often vaguely classed as syphilitic or as scrofulous, whence it has occurred that the points of distinction between the lesions of these diseases have not been clearly and forcibly elaborated. To add to this want of precise and accurate knowledge, scrofula has, by many, been looked upon as in some undefined manner, remotely dependent upon syphilis; so that there has been no serious painstaking endeavor made to differentiate in a scientific manner the features of the bone affections of the two diseases. And further, the view has been entertained by many, that because the lesions of the osseous system are of such grave character, they must necessarily be of syphilitic origin; so that in many instances, although there was not the slightest reason for suspecting syphilis, cases of osseous inflammation and swelling have been unequivocally, and of course, wrongly called syphilitic. In illustration I cannot do better than quote from a clinical<sup>1</sup> lecture by Prof. S. G. Gross of Philadelphia. This gentleman, to whose opinion in matters of general surgery the utmost respect should be accorded, exhibited to his class a colored child, aged two and a half years, as presenting a syphilitic lesion of the osseous system. A year previous its hand had been trodden upon, and, in consequence, the metacarpal bone of the thumb had become inflamed and swollen, in which state it remained. Although there is absolutely no history of syphilis, past or present in the child or in its parents, the lecturer

<sup>1</sup> Philadelphia Medical Times, October, 1872.

told his class that it was a case of dactylitis<sup>1</sup> syphilitica, and *that the bone would never have swollen if there was not a syphilitic taint in the child's system!* Under the influence of such teaching, what progress can be made in the study of the bone affections in infants? Such a statement is undoubtedly based on the opinion that syphilis is the necessary cause of most of the osseous affections in the young. Such being the condition of opinion, I have thought that my work would be incomplete in an essential particular, if I did not contribute to this subject the result of my observations, made while studying with care cases of syphilitic osseous lesions, as well as those which did not arise from that disease.

During the past four years my attention has been called particularly to a series of cases of children affected with osseous lesions. In them there was no history of syphilis, no concomitant lesions or symptoms to point to that disease; neither were the parents syphilitic. I state these facts, as the cases were examined with more than usual care, and used as a means of contrasting syphilitic with non-syphilitic lesions. How, then, shall we explain the origin of the bone affections in these cases? What is their etiology? Examined carefully, these children were found to be pallid, weak and thin, their assimilative processes were far from perfect. They severally suffered with lesions of a hyperplastic character, indicating a lowered state of the vital processes. The hyperplastic or proliferative changes, consisted in glandular engorgements, in tendencies to active hyperemia of the mucous membranes. In them, inflammations were very readily and quickly set up, very severe in character, and were attended with the production of large quantities of pus. The antecedent history of these children varied; in some there had been exhausting attacks of the exanthemata; in others poverty and want of proper food and care had induced a low state of the system; while in a third class a naturally feeble organism had

<sup>1</sup> In Dr. Gross's "Surgery," published in 1872, he states that dactylitis syphilitica, which, as is well known, is universally regarded as rare, is common in his practice. At that time, this statement seemed somewhat remarkable, as there were then less than six cases of it reported in all literature; but since the publication of this case and the comments thereon which shows us clearly in what an unprecise and easy manner the diagnosis of syphilis is arrived at, it is readily understood why the Professor enjoys such an exceptional experience.

by the influence of a succession of mild affections, or perhaps of a persistent dyspepsia, or of a diarrhoea fallen into a state of great anæmia. Their condition may, perhaps, be called scrofula, yet whatever name is applied to it, it consists essentially and pathologically in a state in which the blood-making function is greatly impaired and the general nutrition of all of the tissues seriously at fault. In the latter there is a tendency to excessive cell-proliferation, while hyperæmia of great intensity is very liable to occur. In the osseous system of such subjects there is no immunity to these abnormal changes, but, on the contrary, by reason of its very rapid growth, they are liable to develop. In this connection it is well to remark that owing to this activity of growth, traumatic causes, even slight, are capable of inducing inflammation, which, moreover, may be exceptionally severe if it occurs in a child whose nutrition is lowered in the manner just now described. It is also true that in traumatic osseous inflammation syphilis may exert a powerful modifying influence. I think that these facts, which are based on careful and extended clinical study, will convince observers that a condition of lowered nutrition of the infant may predispose to the development of osseous lesion, and that such may occur as a result of traumatism simply and without the existence of a syphilitic taint.

An important question here arises, namely: Are there any distinguishing characteristic in these osseous lesions which will enable the physician to promptly and correctly diagnosticate them from those of syphilis? It must be confessed that in the main they resemble in many particulars the lesions of syphilis, still there are certain quite constant features which are important to know. As a rule the osseous lesions, above alluded to, are developed rather rapidly, may be complicated early by degeneration, and, for the most part, do not primarily affect the joints. There are usually a smaller number of bones involved than in syphilis, and there is a greater tendency to unsymmetrical development. Pain is generally a constant symptom, and, in short, there is usually a much more pronounced condition of inflammation than we find in syphilis. When degeneration occurs there may follow sinuses which have the typical scrofulous appearance, which we have observed to be not constant in syphilis. Finally a point of some importance may be determined by the bone or bones involved; thus, in this condition, it is very probable that the cranial bones

would be unaffected, and that the lesion would be limited generally to the long bones, or perhaps to the phalanges, whereas in syphilis we have found that a number of different classes of bones were often coincidently involved. Still, as I have said in the chapter on diagnosis, the distinction very often rests upon the history of the case, and upon the co-existence of lesions, which are undoubtedly syphilitic. Treatment will not always afford conclusive evidence, but it may sometimes assist in a measure. There is an interesting clinical fact worthy of remembrance, which is, that when these same osseous lesions occur later in the life of the child, there is a decided tendency to articular complication, indeed, in many children under these circumstances, the morbid process begins in the joint.

Dr. S. C. Busey,<sup>1</sup> of Washington, has recently reported a case, which is of decided interest in this connection. It was that of a female child, in whose parents there was no history of syphilis and in whom there is no mention of syphilitic affections. Apparently healthy at birth it had, when three months old, an eruption affecting the entire scalp and described as scabby. A bronchial affection supervened when six months old, followed by a severe diarrhœa at its tenth month. These two affections continued until the child was reduced to fourteen pounds in weight. When thirteen months old, being still in miserable health, a swelling of the left middle finger was found, limited to the first phalanx and measuring near its metacarpal articulation two and half inches. Remaining indolent for four months fluctuation was discovered, which, on its being incised, gave vent to pus. During the following two months the swelling decreased slightly.

In the total absence of any evidence of syphilis, I am inclined to think that this osseous inflammation was induced by the profound state of cachexia. The case illustrates very forcibly the general position which I have taken as regards the development of bone-inflammation. There are points in the case which are interesting, and at the same time suggestive of a non-syphilitic origin. The details of the case and its illustration show that the lesion begun and was greatest at the proximal end of the bone. Now, we know that in this position the

<sup>1</sup> Case of dactylitis syphilitica in a child eighteen months old.—*American Journal of Medical Science*, Oct., 1874.

epiphysis is situated, consequently it is fair to assume that the lesion was developed at its junction with the shaft. In our study of syphilis of the phalanges, we found that in every recorded case of infants, the whole bone was uniformly enlarged, and that the peculiar syphilitic processes which occur at the diaphyso-epiphysal junction had not as yet been met with in these bones. We are warranted then in assuming this to be the rule, nevertheless it may have its exceptions. Thus this point militates somewhat against a syphilitic origin, and in the event that it was syphilitic the instance would be exceptional. At a recent meeting of the Dermatological Society, Dr. E. L. Keyes exhibited a cachectic child, with inflammation attended with degeneration at the junction of the distal epiphysis with shaft of the radius. Of the cases seen by me, which illustrate this condition, in some the phalanges, in another the metacarpal and metatarsal bones, and in others the long bones, were involved. Some of these were my own cases, while others were submitted to me for study and opinion by friends.

It is to be hoped that, in future, in the study of these cases a hasty diagnosis of syphilis will not be arrived at and that observers will bear in mind in forming their opinion, the condition here described.

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#### VAGINO-CERVIPLASTY IN LIEU OF AMPUTATION OF THE CERVIX UTERI. IN CERTAIN FORMS OF INTRA- VAGINAL ELONGATION.

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CERTAIN abnormalities of the female sexual apparatus are explained by teratological facts based upon the study of embryology. An arrest of embryonic development, a fixation of a perfectly normal transitory state, or a failure of the second formative pubertic development, results in a permanent anomaly materially affecting the future generative functions. The converse of this



is equally productive of mischief, as an excessive developmental impetus results in a loss of anatomical and physiological correlation, and determines an increase of one or more of the factors of copulation, generation, or parturition. These propositions are demonstrated by the presence of a double uterus and vagina, or a double vagina and single uterus, or the absence of the vagina with a rudimentary uterus and well-developed ovaries, and various other heterodox formations indicative of arrested or excessive embryogenic impetus. The interconnections of the vagina, bladder, rectum, uterus, oviducts and ovaries indicate certain relations that are not to be transgressed without inducing portentous troubles, as represented by dyspareunia, dysmenorrhœa, dystocia or sterility. Whether these abnormalities of relation and place be the result of arrested embryonic genesis, and therefore congenital, or they result from direct traumatism, or indirect pathogenesis, the gynæcologist's ingenuity, as well as his patience, is sometimes taxed to the utmost. In some of these teratological conditions, as well as in traumatic and pathological states, a restoration of place, and a reëstablishment of order may be accomplished by the intervention of art. An understanding of the development and functions of the vagina, as well as its abnormal implantations, will explain the philosophy of certain surgical procedures I have instituted in the hope of overcoming some so-called uterine displacements and deformities. Ever since the days of Récamier and Lisfranc, an intravaginal elongation of the cervix uteri, either real or apparent, has been summarily disposed of by excision or amputation. Clinical observation has demonstrated the correctness of the treatment in *true* hypertrophic elongation, but such a procedure in the *apparent* form of the lesion is actually a mutilation, and in some forms, complicated with more or less of procedentia, the operation of amputation of the cervix is fraught with immediate dangers from hemorrhage (primary and secondary), peritonitis and septicaemia, and remote troubles in parturition, should the sterility be overcome.

Embryologically considered, the vagina is a mixed organ, intermediate in function and position, and is formed by the hollowing out of a membranous spur, a true cloacal septum, between the bladder and rectum, which takes place about the eighth week after conception, at which period the cavities of the

uterus and vagina are continuous. Towards the fifth month the two organs are materially distinct, and if no arrest of development has taken place, or no increased formative action been manifested, the implantation of the vagina upon the cervix, (histological fusion), will be such as to leave the proper pubertic angulation somewhere in the neighborhood of one hundred and fifty-five degrees, and the correlations of place symmetrical. The vagina in the perfect woman is normally fused to the cervix higher upon the posterior than upon the anterior surface, and is likewise reflected upon itself from its posterior wall down upon the cervix, its pelvic superior extremity being convex and in juxtaposition with the peritoneal fold in Douglas's pouch. Anteriorly, but on a lower plane, it is attached to the cervix behind and the bladder in front, and sends processes or duplicatures in a horizontal direction, without dipping or folding upon itself as in the posterior fornix. In totality, the vagina is an inverted cone, with a greater amount of ballooning posteriorly than anteriorly.

The sustentative functions of the vagina depend upon its surrounding connective tissue, as well as its attachments to the pelvic fascia from and around the bladder (the pubo-vesico-uterine ligaments of Hyrtl), and the dissepiments and processes of musculo-serous tissue attached to the sacro-lumbar ligaments. When no increment, either of vascular, muscular, or connective tissue, takes place, the vagino-cervical fusions are mutually sustentative and supporting, and it is only when the correlation of place and order is destroyed by pathogenetic causes, that we are called upon to treat post-pubertic lesions and congenital or teratological abnormalities.

The anomalies of the uterus, the oviducts, and the ovaries are quite frequent, and their study is productive of many interesting deductions; but it is to the correction of some of the anomalies of the vagina as productive of dyspareunia, dysmenorrhœa, and sterility that I propose to limit this paper.

The intravaginal portion of the cervix uteri in the average sized nulliparous woman has a dip of about six lines, and in the child-bearing woman somewhat less, but with a corresponding increase in length in the supravaginal portion, the isthmus and the fundus. The depth from the os externum to the fundus of the nulliparous woman during the intermenstrual period is a

fraction over two and a half inches, and something less than three inches in mothers. Any marked increase beyond these measurements is indicative of hypertrophic elongation of the cervix, sub-involution of the entire organ, the presence of a neoplasm, or hyperplastic formations. The persistence of the normal measurements in totality, notwithstanding an excessive elongation of the intravaginal cervix indicates a faulty implantation of the vagina, or a possible condition of inequiform uterus with hypertrophic elongation of the cervix, although no such case has as yet been recorded of which I am cognizant. The deduction then is, that an amputation of an elongated intravaginal cervix, however great it may be, when the measurements do not exceed three inches, is a mutilation and should not be done until other procedures have failed. When the converse implantation of the vagina takes place (the measurements being less than three inches in the longitudinal axis), the so-called infantile neck exists, but why such a misnomer should have been applied I cannot understand, as during infancy the neck is much more developed than is the body. This formation is teratological, and the actual condition is an implantation or fusing of the vagina too low down upon the cervix, giving it an intravaginal dip of hardly more than one or two lines. As the first condition is the anomaly of excessive vaginal dimensions, the latter is the anomaly of defective vaginal dimensions.

For the anomaly of defective vaginal dimension, nothing as yet has been devised to overcome it; possibly a plastic sliding of the vagina upwards, the converse of the operation to be described in lieu of amputation of the cervix, may be successfully performed. It is feasible in performance, but difficult in execution. The amputation of the cervix, as advised and performed by Huguier for hypertrophic elongation is familiar in its details to every gynæcological surgeon, but so enthusiastic was he in its recommendation, that its dangers have in a measure been overlooked.

There are cases recorded where the peritoneal cavity was opened with the écraseur; by Marion Sims, whose case recovered after stitching the wounded surfaces; by Breslau, where the vaginal section was followed by an extrusion of the intestine; by Biefel, where death from peritonitis followed an opening into the bladder; by some Parisian surgeon (reported by Blanquinque)

where death ensued from hemorrhage and peritonitis on the same day; by Langenbeck, where the peritoneum was also wounded; by Meadows, who described another, and by Peter, the French translator of Bennet, who mentions still another fatal one. Why such an accident takes place during *écrasement*, is readily understood when we recollect that, in all cases of hypertrophic elongation, the peritoneum is dragged down with the cervix, sometimes as low as the level of the sacculated bladder—most always in the retro-uterine space, and may even pass out of the vulva, as in a specimen in St. Thomas's Museum, and figured by Barnes. But to these cases the procedure of vagino-cervioplasty is not applicable; they are merely mentioned as illustrative of the dangers of amputation of the cervix by linear *écrasement*, to which may be added the farther hazards of hemorrhage when the conoid operation of Huguier is made.

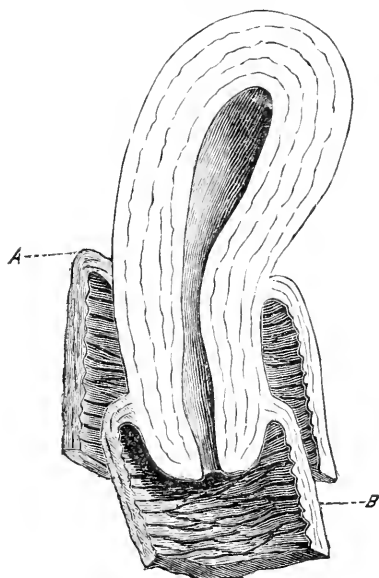


Fig. 1. A. Abnormal implantation of the vagina producing intravaginal elongation of the cervix. B. Normal vaginal implantation. This figure is given as illustrative of the mechanism of the lesion under consideration by comparison of the two conditions.

Vagino-cervioplasty is applicable to those cases *where the longitudinal diameter of the utero-cervical cavity does not exceed three inches, but where the intravaginal portion of the cervix is so long as to interfere with either locomotion, sitting, coition, menstruation or conception*; and for the removal of which Marion Sims devised his double-flap operation, and other surgeons the galvano-cantery loop.

One of the most remarkable instances of excessive vaginal elongation is reported by Martini of Biberach, where the posterior fornix was attached to the fundus of the uterus, but ordinarily the fusion takes place about on a level with the isthmus. The retro-uterine pouch does not descend below the attachment, so that with care it need not be invaded; in fact the dissection should

not be so high posteriorly as anteriorly, but to equalize the strain upon the sutures all around, the mucous membrane must be stripped lower down from the posterior than from the anterior cervix. In performing the operation, etherization being completed, the patient is placed in the semi-prone position, a Sims speculum used, and the cervix steadied with the double-spring tenaculum, which gives entire control of the organ in case it is necessary to call upon an assistant to hold it.

Vagino-cervioplasty consists in a circumcision of the mucous membrane by means of a bistoury, with its cutting edge at right angles to the shank, and then stripping it from the cervix, at a point about three lines from its distal extremity anteriorly, a little more than two lines posteriorly, and carrying the dissection upwards for about an inch anteriorly, more than an inch posteriorly. This leaves nearly the whole of the vaginal portion denuded of its mucous covering. The hemorrhage is but slight, as no vessels of any magnitude are normally encountered. The next step of the operation should not be commenced until all bleeding has ceased, as it is of the utmost importance to see each section of the submucous connective tissue. The first incision is made with scissors curved on the flat, cutting with the concavity towards the cervical tissue; when a separation is made, a tenaculum is hooked into the mucous membrane, and the dissection is carried half way around the cervix, when the tenaculum is handed to an assistant, and another inserted into the undenuded mucous membrane where the stripping was first commenced, and a similar separation is made on the opposite side until the first is met.

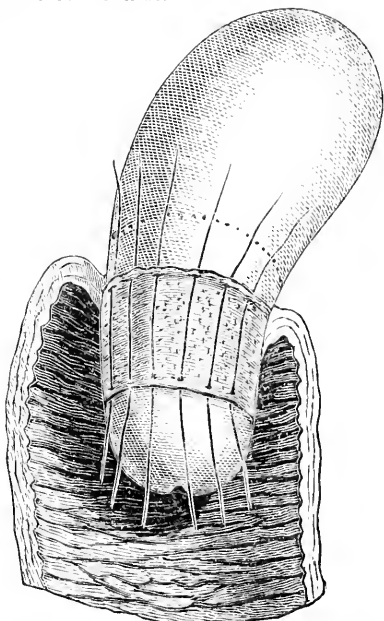


Fig. 2.—Showing the line of separation above the stripped cervical mucous membrane, and the position of the silver sutures before the sliding is perfected.

The depth of these incisions of separation varies from three to eight lines according to the greater or less length of the cervix. Should any vessel be divided, and we might meet with an abnormally superficial circular artery, it must be torsioned or ligated at either orifice for reasons well understood. I have never yet had to do this, as the bleeding has been readily controlled by sponging with cold alum water. The silver wire is then passed from above downwards, from without inwards on the upper flap, and from within outwards on the lower flap. The wire of course is drawn through by means of double-looped non-knotted silk thread in small fish-hook shaped trocart-pointed needles. In my first operation I used very short straight needles, half an inch in length, but they were not so easily passed as the fish-hook needles, which were used in the other two. When the wires are all adjusted, three in front and four behind, the parts are drawn together, and the apparently

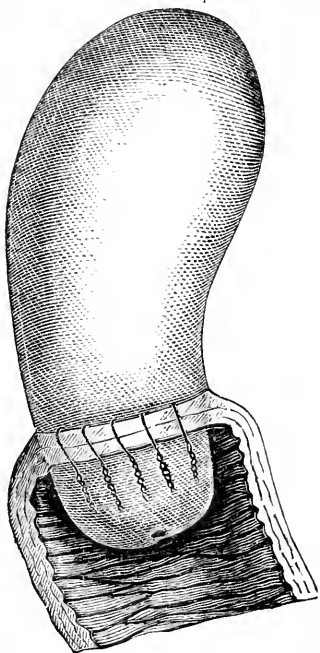


Fig. 3.—Showing the adjustment of the flaps, and the appearance of the neck after vagino-cervioplasty.

elongated cervix is shortened by being covered by the vagina, slid downwards, or rather the cervical portion is drawn upwards into the upper loosened sheath. In the three cases upon which I have operated, I was fortunate enough to witness immediate union, and removed the sutures in the first case on the sixteenth day, and in the other two respectively on the thirteenth and twelfth day after the operation. The treatment immediately supervening after the operative procedure consists in those cares usually enjoined after any surgery upon the genital organs, such as the horizontal posture, evacuation of the bladder every six hours (or the permanent catheter) for the first four or five days, quiescence of the bowels, and the exhibition of opium, if necessary.

Pelvic cellulitis, non-union of the wounds, inflammatory devel-

opments, in fact any of the sequelæ of pelvic surgery, might supervene after vagino-cervioplasty, as well as after any other operation about those parts, but they are infinitely less probable than if amputation of the cervix had been made.

CASE I.—It is now nearly four years since the first operation was devised (December, 1870), where the patient, a woman twenty-six years of age, seven years married, suffered so intensely during coition that it had not been attempted for about three years prior to my operating upon her—she was, of course, sterile and somewhat dysmenorrhœic. The intravaginal cervix measured an inch and eleven lines in the posterior, and an inch and nine lines in the anterior cul-de-sac, and when the rectum was loaded with scybala, the os tinca protruded from the vulva when she sat down. On the eighteenth of last August, forty-four months after the vagino-cervioplasty, the intravaginal portion of the cervix was less than ten lines in length, both posteriorly and anteriorly. While the sterility has not been overcome, the dysmenorrhœa is trifling, and the dyspareunia does not exist; her marital relations, which had been unhappy, are harmonious and the cervix is quite two inches from the vulva.

CASE II.—In the second case, operated on in May, 1872, the sound entered two inches and nine lines, the intravaginal cervix was acuminate and projected from the posterior cul-de-sac one inch and nine lines, showing that the vaginal implantation was about on a level with the os internum. This lady was unmarried, a teacher of music, and of marked hysterico-hyperæsthetic habit. She was thirty-one years of age, and menstruated first when twenty-two years old. From the inception of her menstrual life she suffered greatly from dysmenorrhœa, and in certain positions, the elongated cervix protruded about half an inch from the vulva and irritated the clitoris. The consequences of this mechanical attrition were most deplorable, and readily explained her hysteria and hyperæsthesia. Leucorrhœa was abundant and the peripheral mucous membrane about the os externum constantly eroded. Not knowing the nature of her difficulty, she had recourse to the usual preparations of valerian, assafoetida, etc., as prescribed under such circumstances. When I first saw her, I desired a physical examination, particularly on account of the intense dysmenorrhœa and persistent leucorrhœa, but my request was refused for several months.

Finally the symptoms were so aggravating that she herself demanded the physical exploration which revealed the conditions above described. The vagino-cervioplasty was made on the second of May, 1872, and consisted of stripping the cervix for an inch and one line anteriorly, and an inch and three lines posteriorly. Seven silver sutures were passed and the patient kept in the horizontal posture for nine days. On the thirteenth day they were removed and menstruation supervened three days subsequently. She still had dysmenorrhœa, but seemingly not so aggravated as before. During the succeeding intermenstrual period the vagina was syringed twice or thrice daily with warm salt water, and the granular erosions on the cervix touched with sulphate of copper crystals or carbolized glycerine. Her hyperæsthesia was less, and the hysteria materially improved. The next menstrual period was accompanied with less pain, and after its cessation the warm douches and topical applications continued at longer intervals. In the course of half a year the intravaginal cervix was seemingly normal, with the exception of a very small os externum, and her menstruations comparatively comfortable. The hysteria and hyperæsthesia ceased altogether. This patient was under observation until September 1st, 1874, and had had no recurrence of her former troubles, and was pursuing her avocations with uninterrupted satisfaction and zeal.

CASE III.—The third and last operation of vagino-cervioplasty was made December 29th, 1873. This lady was twenty-four years old, married, and of course sterile. Marital efforts had ceased for about one year, as the dyspareunia was so great that it was followed by extreme prostration and sometimes by syncope. Leucorrhœa was profuse and constant, and there were the usual erosions upon the cervix, which was slender and acuminated, with an intravaginal dip upon its anterior surface of an inch and seven lines, and upon its posterior surface of an inch and eleven lines. The sound penetrated the uterine cavity to the depth of two inches and ten lines. Here was another case of implantation on a level with the isthmus. When this patient suddenly sat down, the cervix impinged upon the bladder, frequently giving rise to pain, always to vesical and sometimes to rectal tenesmus, as the inclination of the entire uterus was towards retroversion, but not actually retro-



verted save under the downward pressure of the superincumbent viscera, when in the sitting or squatting posture. Chronic catarrh of the bladder was likewise a complication. She had been advised to submit to amputation of the cervix and came to me for that purpose from the State of Tennessee. I proposed vagino-cervioplasty instead, which was made, and the sutures removed on the twelfth day. Unlike the other two cases her menstruation was usually attended with so little pain, that it could hardly be called dysmenorrhœa. The subsequent vaginal hot salt water douches were given, and the topical applications made to the cervical erosions. The leucorrhœa ceased but the cystitis persisted. The cervix, however, had been shortened in its dip to six lines anteriorly, and eight lines posteriorly. As she could not remain in the city (St. Louis) for a longer period of time, she returned to her home and passed from under observation after the second menstrual period subsequent to the operation. On July 17th, 1874, I received a letter from her medical attendant at home, who stated that her dyspareunia was quite relieved, that the cervix was fully two inches from the vulva, and that the cystitis had almost disappeared in consequence of the removal of the irritation caused by the impinging cervix.

These three cases are certainly very encouraging, and indicate that amputation of the cervix, except in malignant disease or hypertrophic elongation, may give place to a plastic operation that saves the woman from an unnecessary mutilation.

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#### INJECTIONS OF TINCTURE OF IODINE INTO THE CAVITY OF THE UTERUS IN HEMORRHAGE AFTER DELIVERY.

BY JAMES D. TRASK, M.D.,

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(Read by invitation, Oct. 20th, 1874, before the New York Obstetrical Society.)

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THE reader of recent English medical journals must have taken notice of the deeply interesting discussions that have taken place, in reference to the treatment of severe post-partum

uterine hemorrhages, by the injection of a solution of the perchloride of iron, properly diluted, into the cavity of the uterus.

This plan of treatment has been advocated of late years by Kiwisch, in Germany, and by Dr. Barnes, in England, and in England and in this country has come to be associated especially with the name of the latter.

At a meeting of the London Obstetrical Society, in February, 1873,<sup>1</sup> the merits of this expedient were discussed by many of the leading obstetricians of that city, and though on the whole the opinions expressed were decidedly favorable to its adoption, those who had seen most of its employment being apparently most pronounced in its favor, it was opposed by some as dangerous, and by others as unnecessary.

The principal objections urged against the practice were the occurrence of pain, shock, and in certain instances of symptoms of puerperal fever. The latter symptoms were attributed to the styptic injection being taken up into the veins of the uterus by their exposed patulous mouths.

The discussion followed the relation by Dr. Heywood Smith, of a case in which death was apparently caused by these injections employed to arrest an obstinate hemorrhage, which came on a few days after delivery and continued several days before it could be controlled. The protracted oozing had occurred, as was revealed by the autopsy, from the mouth of a still gaping artery that was found at the site of the placental attachment. Dr. Smith believed that the iron had been taken up by the sinuses and carried into the veins of the uterus; since the veins were filled with an inky fluid that contained iron, and the uterus was itself stained by the same.

Dr. Routh related a case in which he injected equal parts of "tinct. of steel" and water. It checked hemorrhage effectually. All went on well till the third or fourth day, when puerperal fever set in, and she died. Dr. R. felt hesitation about resorting to its use again.

Dr. Grailly Hewit had a case in which hemorrhage was severe, and recurred in spite of ordinary remedies. A solution of *one in four* of the "tincture" was injected and restrained the bleeding. For three days she was quite well; pains then set

<sup>1</sup> Trans. Obstetrical Society, London, for 1873.

in with puerperal peritonitis, and other grave symptoms, and death occurred in five weeks. The patient's life was doubtless saved by the injection, but its influence in producing her subsequent condition he could not decide.

Dr. J. Braxton Hicks had employed the iron injections a great number of times, and had made inquiries largely among those who had used it, without having seen or heard of any serious results.

Dr. Playfair defended the practice, and considered that the injection employed in the two fatal cases related was too strong. More than that, these were plainly cases of septicæmia occurring three or four days after the injection was used. Dr. Playfair had used the iron several times without any unpleasant consequences.

Dr. Holman had experienced many practical proofs of the safety and efficiency of perchloride of iron in post-partum hemorrhages, and never went to a labor without taking with him the means of employing it if necessary. The experience of other gentlemen was equally in its favor.

On the other hand Dr. Snow Beck had seen nine or ten cases in which death had followed the injection for post-partum hemorrhage, all the women presenting symptoms quite analagous to those known under the name of puerperal fever. According to Dr. Beck, the relaxation of the uterus allowed the canals of both the arteries and the veins to remain open, when the blood was poured out by the arteries, and any styptic injected was too often taken up by the veins, conveyed into the general system, and caused the certain death of the individual. This had been verified on the post-mortem examinations he had been permitted to make.

Dr. Wynn Williams considered it had been clearly demonstrated by the history of the cases as detailed by the previous speakers, that the injection of the solution of perchloride of iron into the uterine cavity was accompanied by considerable risk. Dr. W., in place of injections, swabs out the interior of the uterus with a sponge saturated with equal parts of tinct. perchloride of iron and water, and leaves the sponge with a string attached, to be withdrawn, or subsequently expelled from the uterus.

Dr. Protheroe Smith recognized the dangers from the use of iron.

Dr. Bantock had used the injection once in a case of accidental hemorrhage a fortnight before full time, and death ensued in seven or eight hours, as he believed, in consequence of the injection.

Dr. Barnes, who had seen this patient, was disposed to agree with Dr. Bantock in regard to the case, but considered the fatal termination probably due to shock. In some cases Dr. Barnes admits there is reason to believe that the iron enters the uterine vessels; that there is a certain amount of suction action induced by the relaxed state of the uterus, and by the lateral or semi-prone position of the patient on her back; and he recommends that "the uterus be grasped firmly between the two hands of an assistant during the injection."<sup>1</sup> He moreover urged, that the evils of such an occasional accident were vastly out-balanced by the benefits of the operation, as this was to be resorted to only in cases in which ordinary means had proved ineffectual.

Thus far, it will be seen, no satisfactory explanation had been proposed, of the manner in which the iron thus introduced into the venous system of the uterus gives rise to symptoms of septicæmia.

At a meeting of the Obstetrical Society subsequent to the discussion referred to, Dr. W. S. Playfair, who at the previous meeting had stated that he "had used the perchloride of iron in many cases, and only once unsuccessfully, nor had he seen any evil consequences," reported that he had, a short time before, employed the iron in a case in which, although as he believes, it saved the patient's life, the injection was followed by "very grave and even alarming symptoms." Dr. Playfair says,<sup>2</sup> "when the iron was injected, although the hand was in the uterus, and the clots within it had been as much as possible removed, blood was still pouring out abundantly. The powerful astringent at once corrugated all the blood and coagula it came in contact with, and these hardened clots filled up the uterus, and the canal of the vagina. In due course, these began to decompose, and septic absorption took place. By the fingers and intra-uterine injections, they were gradually broken down and removed. The improvement unquestionably dated from

<sup>1</sup> In *British Medical Journal*, Jan. 11, 1873.

<sup>2</sup> *Obstet. Jour.*, May, 1873. See *Am. Jour. Med. Science*, July, 1873, p. 273.

the expulsion of the two large and decomposing coagula on the the sixth and seventh days of delivery."

Dr. Playfair would, in view of such an occurrence, by no means lay aside the use of this remedy, but seek to secure the expulsion of the coagula, as soon as possible after all risk of hemorrhage had ceased.

Dr. Braxton Hicks, at the February meeting, had reported a case in which the injection was used with success, but twenty four hours afterward pains arose, and it was found that the uterus contained hard, blackened coagula which it could not expel. These were broken up and washed out, and the patient did well.

It is quite certain, that the explanation of the admitted occurrence of septicæmia after these injections, is to be found, not in the mere entrance of iron into the uterine vessels, but in the retention within the uterus and in its vessels of the coagula necessarily formed, and their subsequent decomposition.

It is quite remarkable that this objection to the use of a salt of iron for such a purpose has not before been urged. Those who have had occasion to use these preparations for controlling hemorrhage in various *cavities* of the body, have often had reason to look upon their use with disfavor, and even disgust; since the blood when acted upon by the iron salt forms an extremely tenacious and refractory clot, which proves too often a source of great irritation, and by its presence may defeat the success of any operation. Dr. Emmet has for several years discarded these preparations in all operations involving the cavity of the uterus, the vagina and the rectum. Dr. Lente, writing of the proposed introduction into the rectum of a sponge with its cavities filled with persulphate of iron, says: "Whoever has had to deal with a rectum or vagina after it has been so treated would require to be pretty thoroughly alarmed, and at his wit's end for a resource, before he would adopt it."<sup>1</sup>

Dr. J. Byrne, Surgeon to St. Mary's Hospital, refers to the persulphate, as an agent than which he can conceive nothing more "filthy and abominable," under all circumstances, as a uterine or vaginal styptic. Of course these objections do not apply to the use of pledgets of cotton properly moistened with a solution of the iron salt.

<sup>1</sup> 1 Amer. Jour. Med. Science, July, 1873, p. 18.

From the known behavior, therefore, of the salts of iron in their action upon blood, it might reasonably have been anticipated that serious drawbacks would be encountered in their employment within the cavity of the uterus. We have already seen, that such have been experienced in several instances, by those who have resorted to these injections in post-partum hemorrhage, but the true solution of the ultimate ill-effects following the injections, at the time of this discussion, was not understood. Retention of coagula within the cavity of the uterus leads to their decomposition, and this is the unquestionable source of the septicæmia that has followed.

Dr. Barnes seems not to suspect this, and in referring to one of the fatal cases reported in the course of the discussion says, "Dr. Routh's case was one of septicæmia, for which he certainly could not blame the perchloride;" and seeks an explanation of the accident in the fact that "flooding predisposes powerfully to septicæmic fever."

Dr. Braxton Hicks, also sympathizing with Dr. Barnes in his estimate of these injections, expressed his belief that pyæmia might result from depression after severe hemorrhage where no injections had been used.

That septicæmia not unfrequently follows injection of the salts of iron into the cavity of the uterus must be regarded as established. The important question arises, are there other agents at our command which can be substituted for the salts of iron, equally efficient in controlling hemorrhage and free from the risks incident to these? Dr. Protheroe Smith, in the discussion referred to, raised this question, and urged upon the members of the Society the trial of the undiluted tincture of matico, which he regards as a powerful styptic. No other substitute than this for the salts of iron seems to have been suggested by any member present.

The perusal of this discussion brought forcibly to recollection an article published many years ago, commending the injection of tincture of iodine into the uterine cavity, as a means of checking hemorrhage after delivery. On search this article was found in the library of Dr. Purple of this city, in the *North American Medico-Chirurgical Review*, Vol. 1, 1857, communicated by M. Dupierris, M.D., Havana, Cuba, whose name appears as one of the Corresponding Fellows of the

New York Academy of Medicine. This article was published at a date when injections of the uterine cavity under any circumstances, were but little practiced, and it seems to have failed to attract the attention which the originality and boldness, as well as the success of the expedient, deserved. As this is the only record of the practice which, so far as I am aware, has been published, I have thought a brief abstract of the cases would be instructive.

CASE I.—Hemorrhage after delivery of a double-headed monster by forceps. Friction of the abdomen and compression of the aorta were tried ineffectually. Injection of tincture of iodine suggested itself, and so soon as it could be procured, a half-ounce of the tincture, diluted with an ounce of water, was thrown into the uterus through a tube passed into the interior. The “liquid was immediately rejected by uterine contraction,” and she had a favorable recovery.

CASE II.—Patient was very feeble and anæmic, with contraction of the pelvic outlet. She grew weak, the extremities became cold, and internal hemorrhage was apprehended. The forceps were applied and the head extracted, “followed by a considerable quantity of blood.” The hand being introduced in search of the placenta, no uterine contraction was induced. Iodine injections were now employed in the same manner as in the previous case and the inertia and hemorrhage ceased.

CASE III.—Was seen in consultation with two others. Considerable hemorrhage had followed the expulsion of the fœtus. Attempts made to remove the placenta had failed. Many means had been resorted to ineffectually; one of the physicians continued to compress the abdominal aorta, notwithstanding which the blood continued to flow. She had frequent convulsions, dyspnoea, syncope, and cold sweats over the body, the breathing too was accompanied by rattling, the pulse disappearing at every faint. Iodine injections were proposed by Dr. D. and the necessary materials sent for. In the meantime stimulants were given, the hand introduced, and the placenta, which was partially detached, was removed by the fingers, “but all means employed to cause the womb to contract still proved useless,” and the uterine hemorrhage continued. So soon as procured, tincture of iodine was injected “in the same way

as in the preceding cases, and the results were equally successful, causing cessation of the hemorrhage and of the uterine inertia." Great difficulty was experienced in bringing about a rally from the immediate effects of the loss of blood. She was made to breathe ether or rum, and when faint the vapor of ammonia. For seventy-two hours she remained in a condition of extreme peril, but finally recovered.

Dr. Dupieris assures us of the success of this practice in every form of uterine hemorrhage, whether immediately after delivery or later in the puerperal period, or occurring as menorrhagia.

These cases certainly were not inferior in gravity to those reported as treated by injections of the iron salts, and that recovery should have taken place in Case III. is very remarkable; but even in this case, we see that the stimulus of iodine was sufficient to excite the apparently extinct reflex action, and secure contraction of the womb.

As regards the mode by which the remedies act which are ordinarily employed for checking uterine hemorrhage, there is of course no dispute. Whether it be cold in its various forms, pressure or frictions, peripheral irritation stimulates the muscles of the womb to contraction, causing compression of the blood-vessels and cessation of the flow. In certain cases the nervous centres can no longer be roused, the uterus remains flaccid, and the hemorrhage uncontrollable.

It is in these cases, fraught with imminent peril, that Dr. Barnes conceives styptic injections may be profitably employed, to procure contractions and corrugation of the inner surface of the uterus. By this means the flow of blood is arrested in the act of pouring from the open mouths of the vessels which become sealed up by coagula; and it is to these cases that Dr. Barnes would confine its use.

In the teachings of all the schools, the essential difference in principle upon which post-partum uterine hemorrhage from the unimpregnated uterus, or from cut surfaces, should be treated has always been a cardinal point. The veriest tyro knows that, in flooding after delivery, uterine contraction must be secured or his patient lost. The suggestion therefore that the mouths of the vessels may be plugged up by the local use of a powerful styptic, in cases in which contraction cannot be



secured, has attracted, as may be supposed, much attention. Previous to the introduction of the per-salts of iron we had no astringent sufficiently powerful to suggest such a practice.

While these local effects are undoubtedly produced, it seems more than probable that even the injection of the salts of iron, when it produces a beneficial result, does so more usually by arousing the uterus by its peculiar stimulus to contract; in this differing in no respect from frictions, cold and pressure. This is confirmed by the statement made during the discussions before the Obstetrical Society, by Dr. Sell of New York, "that at the University of Vienna, which could boast of 7,000 to 9,000 deliveries annually, the employment of such injections was the treatment upon which reliance was placed in post-partum hemorrhages, provided ergot and injection of cold water did not arrest the bleeding." According to this authority a weak solution of ferrum sesqui-chloridum,  $\text{ʒi}$  ad aquæ  $\text{ʒlb.}$  was gently injected and repeated till the hemorrhage ceased. It is plain enough that the success of such injections cannot depend upon the coagulation of the blood in the orifices of the exposed uterine vessels, as Dr. Barnes contemplates, but upon their power to excite the motor nerves of the uterus.

We have also the direct testimony of reported cases. In the *British Medical Journal* for March 7th, 1874, in a case in which  $2\frac{5}{8}$  tinct. perchloride of iron to  $8\frac{5}{8}$  of water was used, "it not only controlled the bleeding, but caused firm and persistent contractions of the uterus." In the same for April 4th, Case I., perchloride one part in four "was followed instantly by firm contraction, very different to the weak flabby contractions which were felt before, and by arrest of hemorrhage." Case II.: "Perchloride one part in eight, firm contractions immediately followed" and bleeding ceased. In the No. for May 9th, is a case in which one part of liquor ferri perchloridi was mixed with five or six of water, and the hand was expelled, and not a drop more blood lost. Dr. Barnes explicitly recognizes the efficiency of these injections in provoking contractions of the uterus. Though he expressly limits their employment to "cases where the uterus could not be made to contract, where he could not rely upon reflex excitation, when grasping the uterus must at length be abandoned, then it was that the perchloride came in as a new power to save life in the last extrem-

ity;" though again he describes the still running blood as being instantly seized at the mouth of the blood-vessels which become sealed up by coagula, so that the system has time and opportunity to rally, and by and by the contractile power returns, yet at another place he declares that he had "often had his hand in the flaccid bleeding uterus to clear out placenta and clots, and felt the inner surface of the uterus contracting, corrugating, crinkling under the contact of the iron as it flowed, stopping the bleeding and expelling the hand."

Since the cases here described are those in which all hope of exciting contractions by ordinary means was gone, it is plain that we must recognize in the salts of iron, if nothing more, a most powerful accession to our means of exciting reflex action when it had seemed hopelessly extinguished.

By reference to the cases of Dr. Dupierris, it will be seen that the injection of diluted tincture of iodine in like manner promptly induced reflex action, and rescued the patient from the extremest peril, when all ordinary means of inducing uterine contractions had failed. The *tincture of iodine* and the *salts of iron* are thus brought into direct comparison as exciters of apparently extinguished reflex action in the uterus; and there seems to be good grounds for believing that the one may be at least quite as efficacious in this respect as the other. It is, of course, premature to draw conclusions from the few cases of the employment of iodine which can now be presented, but the power of iodine to induce contractions even of the fibres of the unimpregnated uterus is a matter of experience. Reference has been made to the employment of tincture of iodine as a hæmostatic, by Dr. Emmet, at the Woman's Hospital, in operations upon the uterus. Churchill's tincture of iodine undiluted is used in his practice with the most satisfactory results when applied, for example, to the surface exposed after removal of a fibroid. We have seen in these operations the flow instantly cease, and the mixed fluids suddenly forced out through the os from the sudden contraction of the muscular fibres of the womb, directly upon the injection of the iodine. The experience of Dr. Dupierris confirms the hæmostatic power of tinct. of iodine in all forms of hemorrhage from the unimpregnated uterus as well as in post-partum bleeding.

Dr. Fordyce Barker informs me that during the past year he

has treated with perfect success, a case of very severe hemorrhage following miscarriage, by injecting about an ounce of undiluted tincture of iodine.

It is but justice to Dr. Emmet to state, in this connection, that the power which tincture of iodine possesses of stimulating the muscular fibres of the womb to contraction suggested to him its applicability to the treatment of uterine hemorrhage after labor, and that he has for several years insisted upon the feasibility of its use and its certain efficiency.

Adopting Dr. Emmet's suggestion, Dr. G. T. Harrison has recently treated with success a case of serious post-partum hemorrhage, by injecting a drachm of Churchill's tincture of iodine.

Should further employment of tinct. iodine prove, that by our estimate of its claims as a uterine hæmostatic it is not over-rated, it will be seen that it is adapted to most of the cases in which Dr. Barnes now regards the salts of iron as affording the only hope.

But we have seen that it is not as an excitor of uterine action that the use of the iron solution is advocated, *but as a means of closing the mouths of the vessels by coagula when contractions can no longer be provoked.*

We have satisfactory evidence that the solution of the iron salt, of the strength employed by Dr. Barnes, may act in this manner alone.

On this point we have the evidence of Dr. T. Snow Beck: "The use of the perchloride is sometimes not followed by any perceptible contraction or by only partial contraction, by which the flow of blood is arrested and the way to injurious impregnation of the general system is left open." In a case reported in the *British Medical Journal*, May 2, 1874, it is stated that perchloride of iron was injected, "no pains ensued, *the uterus remained large*, there was no further loss." She sank in three hours; sinuses were found filled with coagula, the uterine tissue tinged of a dark color.

Prof. Lusk has favored me with the following memoranda of three cases occurring in Bellevue Hospital, in which iron was employed, and which are here introduced. In Case I. Prof. Lusk informs me the uterus remained flaccid, notwithstanding the hemorrhage was arrested.

July 18th, 1871.

CASE I.—Louisa King, æt. 20. Primipara.—After twelve hours labor, the os dilated fully and the head began to engage. Anterior lip compressed against cervix. Pains good. After four hours further effort, forceps were applied, but no advance was accomplished.

Ten hours labor; as the woman was exhausted and no progress had been made, forceps were reapplied and the woman delivered of a living child. Chloroform given during nearly entire labor. Delivery of child was followed by excessive hemorrhage. Woman nearly exsanguinated before it could be controlled. Other means having failed, compression of the abdominal aorta was resorted to, and the uterus was injected with liq. fer. persulph. and water equal parts. Hemorrhage was checked. For the two days following the woman did well. On the third, septicæmic symptoms were developed—lochia became excessively offensive, respiration stertorous, pupils dilated, and general paralysis. Died at the conclusion of the third day.

Diagnosis—septicæmia and embolism.

No autopsy.

July 8, 1871.

CASE II.—Annie Clinton, æt. 28. Primip.—After four hours labor, os dilated. Half an hour later uterus suddenly enlarged and pulse became thready—ice was applied, ergot given, and assistant made firm pressure over the fundus—forceps applied and child delivered—alarming hemorrhage followed—ice placed in vagina and over uterus—hand introduced into uterus without effecting contractions—hemorrhage arrested by injecting liq. ferri persulph. and water equal parts.

Woman recovered without a bad symptom.

July 9th, 1871.

CASE III.—Eliza Moore, æt. 23. Breech case.—Length of labor 9 hours; birth of child followed by alarming hemorrhage, controlled by liq. fer. persulph.

She made a good recovery.

In what proportion of cases the uterus fails to contract, after these injections, and life if saved at all is saved by the

simple coagulation of blood in the orifices of the vessels, we have no means of knowing. Neither do we know that the fatal cases in which symptoms of septicæmia are developed, are confined to those in which no contraction takes place, *but it is in these last that we have all the conditions for this accident.*

After reading the history of four fatal cases, one of which was that of Dr. Heywood Smith, related by Dr. Snow Beck in the *British Medical Journal*, in which autopsies were made, one cannot hesitate to adopt the language of Dr. Beck when he remarks, "It is singular how these cases are repetitions of the same fact with only a slight modification." After the completion of a natural labor, the uterus becomes sufficiently relaxed to allow the blood to escape from the open ends of the torn arteries. Efforts to induce contraction fail, when a solution of perchlorid. ferri of varying strength is injected into the cavity of the uterus. After the injection of the perchloride, the hemorrhage ceases at once or very soon afterwards; the patient revives, and all things appear to be going on favorably till about the third day, when the usual series of fatal symptoms commence. "In the examination after death, the vessels are found more or less filled with an ink-black colored fluid, which from its similarity to the secretion on the inner surface leaves no doubt that some of this fluid has entered these canals through the open orifices at the inner surface of the uterus." The history of the cases of Drs. Routh and Hewit, and Prof. Lusk correspond with these. We now know that the fatal symptoms subsequent to these injections are due, not to the mere introduction of iron into the veins, but to septicæmia from the decomposition of the coagula.

It would seem that the degree of liability to disaster after the injection of iron salts, depends upon the completeness with which contractions of the womb are secured. A contraction of the muscular fibres sufficient to compress finely the blood-vessels and to empty the uterus, must effectually prevent the retention of coagula in the uterine cavity, and possibly the formation of thrombi in the vessels.

In the discussion referred to, exception was taken to the strength of the injection employed; but while this is by no means unimportant, it is yet plain that the stronger solutions

are much more likely to induce the contractions upon which the woman's safety really depends than are the weaker, and that the local action of even the strongest solutions independent of the coagulation they produce, cannot be held accountable for the disastrous results.

In comparison with *iron, tinct. of iodine* has the advantage, so far as we now know, of being perfectly safe; at any rate, free from the evils incident to the employment of iron. Besides this we have the direct antiseptic influence of the iodine upon the uterine and vaginal mucous membrane. The application of iodine to the lining membrane of the uterus is, probably, of all things the surest means of counteracting a tendency to absorption of septic matter into the system after delivery. Since adopting the practice of injecting tr. iodine after operations upon the interior of the uterus, Dr. Emmet has not encountered a single case of septicæmia. As contrasted with the salts of iron in this respect, it would seem as if there could be no room for hesitation in the choice. From the local action of iodine not only is nothing to be feared, but even advantage to be anticipated, while from the local action of iron much may be apprehended. As an excito-motor agent, iodine is probably at least equally good, while incapable of causing the formation of thrombi in the uterine vessels. In view of these facts one would feel justified in resorting to the iodine earlier than to the iron, and in this respect also an advantage may be gained for the patient, since the use of iron is expressly limited to cases deemed hopeless under ordinary management.

We all know how impossible it is to limit the use of any expedient to the cases for which it is expressly designed. Thus was it with Simpson's plan of detaching the placenta, distinctly limited by its author to cases of extreme severity in which the life of the child was of the least moment, and yet employed by not a few as early as the state of the os would permit. The same is true of the subject under consideration. Dr. Hicks, a practitioner of deservedly large influence, had used the iron injections a "great number" of times. No matter how extensive a man's practice may be, he can scarcely have met with a "great number" in which the conditions are those which Dr. Barnes prescribes; and indeed, as we have already seen, we find Dr. Barnes himself acknowledging the influence of the injection

in causing the womb to contract. In those instances in which the event shows that reflex action may still be excited by a new and efficient stimulant, there surely is no need of the *coagulating* power of the injection. We must admit that a stop may be put to the loss of blood by the local action of the styptic as the blood flows from the open vessels, and that in the absence of reflex action, the woman, if she recovers, must owe her life to the injection as a styptic alone ; but these cases must be exceptional, and form but a very small proportion of those in which it has been resorted to.

In recapitulation we may briefly say that we have sought to show :

1st. That a very considerable proportion of cases in which the injection of salts of iron has apparently saved life, have been those in which it accomplished this end not in virtue of its local styptic action, but because of its power to excite reflex action when cold, friction, pressure etc., have failed.

2d. That when it produces coagulation of blood in the orifices of the blood-vessels there is danger that the coagulation may follow the vessels into the substance of the uterus, producing dangerous thrombi, and that the blood already collected in the cavity of the uterus also may become converted into a hard, intractable coagulum which the uterus cannot expel, and which may, after a few days, decompose and give rise to septicæmia.

3d. That there is evidence for believing that as an excitor of dormant reflex action, tinct. iodine may be substituted for the iron with positive advantage, from its efficiency as an excitor and from its antiseptic properties.

If these points are established, the use of iron salts in a solution sufficiently strong to induce coagulation of blood in the uterine vessels should, at any rate, not be resorted to until tinct. iodine has been tried and failed.

In conclusion, I would distinctly disavow the position of claiming positively for iodine a superiority over the iron. More facts are needed to warrant this. I have simply sought to present the considerations that render it extremely probable that the one will be found an advantageous substitute for the other, when it shall have received at the hands of the profession a sufficient trial.

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CONTRIBUTIONS TO THE PATHOLOGY AND THERAPEUTICS  
OF DIPHTHERIA.

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TWICE before this evening have I had the privilege to appear in extenso before the medical profession of New York with remarks on the subject of diphtheria. The first time with a paper published in the *American Medical Times*, August 11th and 18th, 1860, to which Dr. Harris, in his recent remarks before the Public Health Association, kindly alluded as the first elaborate essay written since the times of Barth; the second time in a memoir on croup, read before this Society in 1868, and published in the first number of the *Journal of Obstetrics and Diseases of Women and Children*. At this late day I cannot but look upon those two papers as fair exponents of what, if not generally adopted as final, was believed to be based on the numerous facts then known and attested.

In the first paper I described the pseudo-membranes as "differing in size, thickness, color, and consistency; their shape as various. Some are round, some angular, some regular, some irregular; their thickness varies from a film to a quarter of an inch and more. Their color is white, glassy, greenish, gray, yellowish, reddish, brown, according to their thickness, exposure to air, and admixture of blood; unaltered blood adheres, sometimes, to their lower surface. They are either merely adherent to a mucous membrane, without any alteration of its



tissue; such is usually the case on the mucous membrane of the bronchi and trachea, and mostly on the soft palate; or they are imbedded in its substance, as mostly on the tonsils, and the posterior wall of the pharynx, and frequently in the larynx. It is a very remarkable fact that the same continuous membrane will now be readily removed from the surface of the mucous membrane, and again at a very short distance tear the substance of the mucous membrane at every attempt to separate it. The surrounding parts are hyperæmic, and swelled by œdema during life. At post-mortem examinations the œdematous swelling is sometimes found, but the hyperæmia is no longer met with after the refrigerating and contracting influence of the atmosphere has had time to operate. Pseudo-membranes are found in the pharynx, on tonsils, uvula, and velum, on the gums, lips, and tongue, on the mucous membranes of the mouth and nose, in the larynx, trachea, and bronchi, in the superior part of the œsophagus, in the lower part of the intestinal canal, round the anus, in the vagina, the external ear, the naso-lachrymal duct, on the conjunctiva, and on the cutis, wherever and by whatever cause it has been deprived of its surface; thus on sore nipples, etc. In all of these places the chemical as well as microscopical constitution of the membranous exudation is entirely the same."

With these observations before me I could not but believe in the identity of the croupous and diphtheritic process. Both clinical experience and the study of the histological elements of the membranes, or deposits, as far as then understood, appeared conclusive. Nor did further experience, necessarily large in this great city, change my views in that respect, when, eight years afterwards, I returned to the subject, in this very place. In the paper then read (*Jour. Obst.*, May, 1868, p. 30 *sqq.*) after some remarks upon pharyngeal and laryngeal catarrh, I continued: "Another form is the follicular process on the tonsils with its subsequent changes, the formerly so-called herpetic angina, which I have characterized already in a paper on diphtheria, published in August, 1860, in the *Am. Med. Times*. It is exudative, membranous in character, feverless, but will not infrequently be followed by large croupous or diphtheritic deposits. Another form is the membranous deposit proper, a fibrinous exudation, amorphous in character, mixed with mucus and

blood-corpuscles and normal epithelium. It is either deposited upon the mucous membrane, and then can be easily lifted up from it, or into it, and into its subjacent tissue. The first form has frequently been called croupous, the latter diphtheritic. But whatever clinical difference there may be between a simple membranous inflammation and constitutional diphtheria, there is no anatomical difference between the membranes wherever they make their appearance. Another form, and not an infrequent one, is originally confined to the epithelium, which rapidly undergoes fatty degeneration, which may or may not be complicated with fibrinous exudation. The soft, pultaceous, easily macerating diphtheritic masses are of this character; and the fearful cases of diphtheria with rapid necrosis of the tissue are usually of the same nature. The neighborhood may be in various conditions, œdematous or dry, hyperæmic or anæmic. An œdematous and hyperæmic condition is most frequently found; a dry condition is a frequent occurrence in the necrobiotic process of fatty degeneration; anæmia of the surrounding parts, or interspersed portions, depends on compression of capillaries by infiltration, which means: newly formed cells and connective tissue. Anæmia would once have been considered impossible as a lesion of inflammation, but we have fortunately passed by the time when this nutritive disorder was supposed to depend necessarily on previous congestion of the parts.

All those forms of change of tissue are not found uncomplicated in every given case. When large surfaces are attacked at once, you may see in the mouth a catarrhal proliferation or croupous condensation of the epithelium, on the tonsils a diphtheritic deposit imbedded into the tissue, in the larynx and trachea a plain croupous deposit, and in the bronchi a mucopurulent secretion. And again, under the same endemic and epidemic influences you will find a case of catarrh, a case of croup, a case of diphtheria, a case of follicular exudative amygdalitis in the same family, in the same week. Thus it appears, that in the long list of morbid conditions met with, catarrh on one side, the diphtheria on the other, are but the starting and terminating points between which all the different shapes and forms may be registered according to their dignity—their modification depending on individual, local, endemic and epi-

demie influences. The only form which is perhaps, but perhaps only, to be excluded, is the necrotizing diphtheria. And when we compare the clinical characters of the affection, we find similar differences. The affection may be local without fever, or simply febrile, or local and obstructing, or septic, or obstructing and septic. In some cases the process will not even be confined to the respiratory organs, but similar to the Rinderpest of animals, the digestive organs will participate in the process, and skin, kidneys, spleen may follow."

Now, Mr. President, a careful observation of this year's epidemic, as of those of former years, in which the nature of the cases was the same, only their number less, exhibits the following forms of local change in the complex of symptoms called diphtheria.

1st. Inspection of the pharynx yields catarrhal conditions of its whole surface, or part of it. Soft palate, or pillars, or posterior wall, or tonsils, or some or all of them are of a deep-red color, soft, swelled. This catarrh is a precursor of further development of diphtheria, or its complication. It need not necessarily result in diphtheria, for the number of independent cases of pharyngeal catarrh is very great in every epidemic. The Journal of the Dispensary, from which I took the cases on which was based my paper of 1860, exhibited 185 cases of independent pharyngitis to 200 of diphtheria. Not always is the catarrh very extensive. It is useful to know, and in individual cases very important to notice, that not infrequently small territories of blood-vessels and mucous membranes are in the morbid condition mentioned. This change would be an absolutely indifferent matter in normal times; during an epidemic of diphtheria it may usher in or be the first symptom of a regular attack. Sometimes, however, the differential diagnosis is not easy at all. For in many cases where a slight film of what appears to be mucus is seen to cover a portion of a tonsil on a hyperæmic base, we have in reality to deal with diphtheritic changes in the epithelium, and not infrequently are these the cases in which fever is unusually high, and general symptoms prevalent.

2d. In many cases we have to deal with small deposits as described above. They are not inflammatory, for there is no nuclear proliferation and subdivision, no intimate admixture of

leucocytes, a few of which may, however, be found adhering to the lower surface. The superficial epithelia are the principal sufferers; the lower strata are less changed. Their outlines are but feebly marked, sometimes not perceptible, with the exception of a very indistinct network containing an amorphous granular, dark, contoured material. Such granular material is also found outside the network. Part of it is described as consisting of round, oval grains with sharp outlines, of one-tenth or one-twentieth of the size of a blood-corpuscle, conglomerated, and is sometimes found in large masses. It is said to be frequently not distinguishable from detritus, fine particles of albumen, and fat globules. Because it has been observed to spread and increase rapidly, and because of its similarity to the botanical parasites in putrefying material, it has been taken as botanical, parasitical; and called either sphaero-bacteria, micrococci, or monades. These elements have been presumed to be the essential matter in diphtheria, and the source and means of contagion. The fungous vegetations develop either in the mucons membrane without previous exudation, or in superjacent emudation, and are believed to infect the system by entering the lymphatics and finally the general circulation. Nutritive disorders are said to result from embolism of such parasitic masses, which increase rapidly. Thus not only results a destruction of the tissue and epithelial cells of kidneys, liver, spleen, and heart, but also large pneumonic infiltrations. Besides, in the opinion of some, new and unexpected changes result from the products of poisonous decomposition lit up by the presence of the immigrant parasites (Orth). The tendency of natural philosophy and its daughter, medicine, to realistic appreciation of natural phenomena, and the apparent facility of explaining some facts which are difficult to understand, have been the cause of the almost general acceptation of this theory, which appears to subvert well-nigh all our experience on the slowness with which, as a rule, all scientific progress is developed. The theory is so enticing, I might say bewitching, that we can hardly help burying everything we knew of pathology, and diving headlong into the new fountain of apparently "exact" knowledge. To what extent the best intellects can be captivated by a brilliant theory, especially when they had something to do with the establishment of the new edifice, we can learn from the following

quotation from Prof. C. Hueter's *General Surgery*, 1873, p. 269: "The insufficient penetration of the monades"—this is the name proposed and preferred by him—"into the tissue in cases of croup is an obstacle to their entrance into the lymphducts and blood-vessels, and therefore no serious general symptoms are found in croup. The progress of diphtheria cannot depend upon the effects of the movements of vibrating epithelia, because of their rapid destruction by the monades of diphtheria. When diphtheria gets down to the smallest bronchi the monades emigrate into the pulmonary tissue, and establish a pneumonia. But if it first establish itself on the tonsils and the mucous membrane of the pharynx, it cannot but descend into the larynx, because its access to the cheek and tongue is retarded by the heavy layers of pavement epithelium, and the immigration into the œsophagus is rendered impossible by the same cause. The nasal cavity appears to be better protected than the larynx; perhaps the secretion of muciparous follicles has something to do with that." I have quoted this passage to show to what extent the very best intellect can err when obnubilated by the influence of a pet theory. Not only shall we hear of better reasons for the absence of general symptoms in membranous croup of the larynx, but the whole theory, founded on the rapid destruction of vibrating epithelium, is also defective, for the reason that this very epithelium resists better than any other a speedy destruction by the diphtheritic process. Finally, not only is laryngeal diphtheria not an absolute necessity, as Prof. Hueter appears to believe, and nasal diphtheria the exception, but, on the contrary, the former is fortunately rare, and nasal diphtheria a common occurrence in protracted epidemics.

Nor is this all. We ought not to forget that histologists do not at all agree about the nature of the corpuscles claimed as bacteria in almost all infectious diseases. The number of investigators is very large, and good names are counted amongst them. But I, who am not a histologist laden with new discoveries, am aware of the fact that the world-wide reputation of some of these names is based almost absolutely and solely on bacteria, and that is too narrow a basis. I cannot but warn to be careful in accepting not facts, but their explanations. The reading with the microscope is relied upon as unimpeachable least by

those who are the acknowledged masters in that field. Pannum is positive as to the chemical nature of putrid poison, so is Bergman, and so Vermeil. Billroth has published a series of investigations extending over many years in his great work on Coccobacteria. His conclusions are not identical with the bacteria theory as defined before. He is more inclined to believe that a chemical poison is the source of infectious disease, but that this *may* result from the presence and influence of coccobacteria in the blood. In the No. of Nov. 30th, 1874, of the *Berliner Medicinische Wochenschrift*, Arnold Hiller contends against the alleged characters of the bacteria as pathognomonic. I described, according to the general acceptance, bacteria as possessing well-marked outlines, great brilliancy, and a strong power of reflection. Hiller contends that it requires unacquaintance with botany and bacteria to believe that. According to him, both direct observation and comparison with fat molecules prove that bacteria excel by an opaque dulness rather than by brilliancy and distinct outlines, and for this reason are so remarkably difficult to discover, and that the reflecting power of a micrococcus stands in the same proportion to that of a fat molecule, as the appearance of an yeast-cell to that of a fat globule of equal size. Thus those very alleged characteristics of presumed bacteria would speak for their being products rather of fatty degeneration. Beale, than whom few investigators of bacteria have been more industrious or successful, insists emphatically upon the immense magnifying powers required to properly study these organisms. He also, as is well known, repudiates the idea that bacteria must be causes of the lesions of tissues in which they are found, when bodies precisely similar in appearance are equally abundant in health, "millions of bacteria are normally present in the mouth." However, it cannot be my aim to go beyond my subject; but in connection with our theme, I meant to protest against the dangerous consequences of an exclusive scientific enthusiasm.

3d. The small deposits spoken of under 2d, go on increasing, not only on the surface, but into the substance of the tissue. They have the same appearance, with a tendency to grayish discoloration. Removal of the surface detritus reveals an ulceration of the membrane with a moderate admixture, among the

epithelial remnants, of pus and blood corpuscles.<sup>1</sup> This is the form in which the detritus, bacteria, or whatever either the morbid or nosogenic elements may be, are principally met with. From what has been said of the elementary structure of the two last forms, we may draw inferences which will be found to exist in reality. We may infer that there may be removable and deeply imbedded deposits in close juxtaposition, and that after the removal of a surface deposit, the same process will take possession of the deeper tissues; and such is just the observation which is frequently made.

4th. The last form of diphtherite, as found sometimes on the conjunctiva, and in all cases of diphtherite of the œsophagus, vagina, trachea, and lower portion of the larynx, has been taken to consist of fibrine as principal constituent. The deposit consists of large flaps deposited upon the mucous membrane, lined underneath with mucus corpuscles, and a very few blood corpuscles and epithelia. Even that, according to E. Wagner, is the result of a metamorphosis of the epithelium. But it has been urged that this is impossible. Only lately Senator has insisted upon the fact that, at the most, the epithelium is found in three or four layers, and that these are insufficient for the formation of thick and coherent membranes. The objection is not well taken, for in cases where the pseudo-membrane covering, for instance, the uvula, or soft palate and tonsils in general attains a thickness of several lines, it must be remembered that epithelium is known to reappear rapidly when thrown off or removed. A cast of the trachea and bifurcation thrown up by vomiting was replaced by another one within six or seven hours, and found at the post-mortem examination. The same happens in the nares, where the same author, not having seen cases, denies the occurrence of croup membranes altogether. In many of these deposits the epithelial structure has been noticed to be still apparent. It is not, however, necessary to deny that genuine exudation may be complicated with the original process of epithelial proliferation and transformation. For in the chameleon-like changes of a diphtheritic process, irritation

<sup>1</sup> Fair specimens of this form are found on the tonsils and the upper half of the larynx, rarely the soft palate. Still, I have met with complete perforations of the soft palate in two instances.

of the neighboring tissues, and nutritive disorders of an inflammatory character may be expected to take place.

The several forms of diphtheritic disease, the description of which I have given, have a peculiar tendency to develop in certain localities. Where the whole lining membranes of the air-passages from nares to trachea and the mouth are covered with diphtheritic degeneration, the third form, viz., impregnation of the mucous membrane, with its epithelium, and sometimes submucous tissues, is found all over the tongue, edges of the lips, and frequently over mucous membrane of lips and cheeks; also on the tonsils, at the lower portion of nares, and the upper part, particularly anteriorly, of the larynx. The fossæ Morgagni are also, in most cases, in the same condition; seldom the soft palate, on its posterior aspect, more frequently on its oval surface. The first form, deposits in specks of small size, in the tonsils, and isolated portions of the posterior wall of fauces. The last, the so-called croupous form, viz., deposits upon the mucous membrane, easily removed in large flaps, or readily macerating in the copious secretion of the subjacent muciparous glands, in portions of the nares, in the posterior aspect of the soft palate, on trachea and bronchi.

Certain peculiarities of the tissues in general, the mucous membranes in particular, have frequently been assumed to exert a considerable influence on the nature of the diphtheritic process. Eberth, whose histological knowledge is remarkable, though his clinical observation appears to be but limited, refers<sup>1</sup> to the fact that a violent diphtherite of the larynx need not descend to the trachea, though he exaggerates the frequency of such an exclusive occurrence. Trendelenburg infected the trachea of a rabbit with diphtheritic deposits removed from the pharynx and tonsils, where they had been firmly and deeply imbedded into the tissue, and the results of his experiments were deposits loosely attached to the surface of the mucous membrane of the trachea, where he transplanted them. In general the condition of the mucous membrane varies in different organs and locations. Uniformly we find in successive layers: 1st, epithelium; 2d, the so-called basement membrane, thin and deprived of structure; 3d, connective tissue largely mixed with

<sup>1</sup> P. 6 of C. J. Eberth "Zur Kenntniss der Bakteritischen Mykosen." Leipzig, 1872.



elastic fibres, with blood-vessels, nerves from both the cerebro-spinal and the sympathetic nervous systems, and frequently spindle-shaped nuclei. On the free surface of the mucous membrane we distinguish in addition papillæ, flocci, villi, and the apertures of a number of various glands. *As all of these constituents influence pathological processes in the mucous membranes*, they require a special consideration. I shall first, however, briefly review the parts which are the principal location of the diphtheritic process.

The mucous membrane of the mouth contains a large number of elastic fibres mixed with its connective tissue, and is covered with a thick pavement epithelium in three layers, the upper one flat, the second more polyedric, the lowest oval and perpendicular upon the mucous membrane. Many small papillæ extend from the mucous membrane into the epithelium, thereby resembling the papillæ of the cutis. Acinous muciparous glands are frequent, most numerous on the anterior surface of the soft palate. The lymphatic ducts are very numerous on lips, tongue, uvula, soft palate, anterior and posterior pillars, and cheeks. The uvula contains so many that their injection doubles or triples its size. They discharge their contents into, and in case of morbid irritation infect the deep facial glands. Those of the tongue are more intimately connected with the upper layer of the deep cervical; those of the floor of the mouth, and many of the tongue, with the submaxillary glands. The vasa efferentia of all of them discharge their contents into the superior jugular glands in the trigonum cervicale superius, and finally into the numerous (15-20) inferior jugular (or supra clavicular) glands which through numerous connections form the jugular lymphatic plexus.

The tonsils are conglomerates of an uncertain number of glandular bodies, each of which has a thick capsule with irregular outlines, consisting of connective tissue, and is lined inside with mucous membrane and pavement epithelium. In the connective tissue there are a large number of closed follicles containing numerous lymphoid corpuscles. These follicles have been taken for identical with, or analogous to lymphatic glands. This assumption is problematic, as neither in-going nor out-going lymphatic ducts have been conclusively proven to exist. It would result, as a practical conclusion, that there

was *no* connection of the tonsils with the lymphatic system, nor is the supply of blood-vessels a large one; it is decidedly small in chronic inflammation and enlargement, with hypertrophy of connective tissue.

The mucous membrane of the nares is of various thickness, consists of connective tissue fibres with numerous nuclei, and has no admixture of elastic fibres, but many nerves and an unusual number of blood-vessels. In fact the Schneiderian belongs to those mucous membranes which are uncommonly supplied with blood. Its submucous tissue is, therefore, very apt to swell, or to bleed, as well in diseases of distant organs resulting in venous stagnation as in slight local provocation. The inner aspect of the cartilages is covered with pavement epithelium. The lower portion of the nasal cavity, the so-called respiratory part, as far as supplied by the fifth pair of cerebral nerves, has cylindrical epithelium, and a large supply of acinous muciparous glands. The upper portion, the so-called olfactory part, has vibrating epithelium, and, according to Todd and Bowman, long and straight tubular glands. Some of the epithelial cells have been found, by M. Schultze, to connect with the terminal ends of the olfactory nerves, particularly a layer of those which are more spherical, branching out in two directions, and have been denominated as olfactory cells. In this portion the lymphatics are but slightly developed, but they are very abundant in the lower part, also in the alae. They terminate directly into the deep facial, and the posterior submaxillary glands, with all their connections. Thus the mildest provocation, a nasal catarrh in a child, is apt to produce glandular swelling either temporary or permanent.

The epiglottis has on its anterior or upper surface a pavement epithelium of 0.2 mm. in thickness. On its posterior or lower aspect it is but 0.1 or 0.06 mm. The upper stratum is spherical or polygonal, the deeper more cylindrical and joined palisade-like together. Nearer the insertion of the epiglottis the polygonal cells disappear, the cylindrical then rise to the surface and are supplied with cilia of 0.005 mm. in size. Below them round and oval cells are found to such an extent that the whole epithelial covering measures about 0.15 mm. The same form—ciliated epithelia—are found below on false vocal cords and in the ventricles of Morgagni. But along the posterior

aspect of the pharynx, over the ary-epiglottic folds, where moreover the mucous membrane is lined underneath with a very thick and loose submucous tissue, and along the true vocal chords—the *covering is formed of polygonal pavement epithelium*; in the direction of both the ventricles of Morgagni and the trachea it is replaced by ciliated epithelium in a thin layer. The mucous membrane itself is most loosely attached in the neighborhood of the ventricles of Morgagni, and is very thin, loosely adhering, and often folded upon the true vocal cords. Acinous glands are numerous, from fifteen to twenty on a square centimetre, and longitudinally arranged. They are very frequent about the ventricles, with cylindrical epithelium (rarely ciliated) in the ducts. There are, however, *no acinous glands, no glands of any kind*, in spite of the looseness of the submucous tissue, in *the true vocal cords*.

These acinous glands carry no lymphatic vessels. In other parts of the laryngeal mucous membrane and submucous tissue these are, however, met with. They are, in fact, both numerous and large, with the general character of the lymphatics, viz., endothelium, dilatations, constrictions. In the epiglottis of the newly-born they form but a single layer, in the larynx itself and in the trachea two, in some portions provided with a large amount of submucous tissue, even three. The inner and smaller layer takes a perpendicular, the outer and larger a horizontal course. The posterior aspect of the epiglottis and the true vocal cords (not only during the first year of life) exhibit by far the smallest number and calibre of lymph-vessels.

Agminated glandular substance, that is, lymphatic glands (extensively found in the cat, according to Verson, and always in Morgagni's ventricles in the dog) are rarely found in man. The exceptions found by Luschka, referring to the vestibule of the larynx and the margin of the plica ary-epiglottica, and also upon the posterior aspect of the epiglottis, confirm rather than weaken the rule.

The mucous membrane of the trachea and bronchi contain more elastic than connective-tissue fibres; a fair number of lymphatic vessels, no lymphatic glands; very many acinous glands; and is thickly lined with ciliated epithelium.

The accompanying table will condense some of the above statements.

	NOSE.	MOUTH.	TONSILS.	EPIGLOTTIS.	LARYNX.	TRACHEA.
Elastic fibres.	None.	Many.	Very many.	Many.	Many.	Very many.
Epithelium.	Pavement near cartilage. Cylindrical in resp. part. Vibrating in olfact. part.	Pavement.	Pavement.	Pavement thick ant., thin post. Vibrating at inner insertion.	Vibrating anteriorly, foss. Morg. and false vocal cords. Pavement posteriorly, and true vocal cords.	Vibrating.
Lymph ducts	Very numerous in resp. part. Moderate in olf. part.	Many. Uvula very numerous.	Few, if any.	Moderate ant., few post.	Numerous, usually no lymph glands. None on vocal cords.	Numerous.
Blood-vessels.	Very numerous.		Few.			
Nerves.	Very numerous.		Scarce.			
Acinous glands.	Numerous in respir. part. Tubular glands in olf. part.	Numerous.			Very numerous in vent. Morg., some, however, have no lymph ducts. None on vocal cords. Very copious in plica ary-epiglot- tica.	Very numerous.
Submucous tissue						

Of all the tissues and organs mentioned, the elastic tissue, which enters so largely into the fabric of the connective tissue, is least affected by chemical or organic influences. On being boiled it yields no glue; like connective tissue, it is not changed by water, acetic acid, alcohol, gastric juice, or moderate heat. It is firm, dense, has a degree of elasticity never attained, normally, by any other tissue. It has but few blood-vessels, no nerves; few lymphatics, and a slow metamorphosis. In consequence, upon injuries received, it is not reproduced, but the healing process results in the formation of a fibrous cicatrix.

There is no elastic tissue in the mucous membrane of the nose, a large amount in the oral cavity, and particularly in the walls of the lymph follicles of the tonsils; and such an amount in the trachea that the connective tissue fibres are in the minority. The influence of this anatomical condition on the diphtheritic process must be considerable. It will be easily demonstrable, that where elastic tissue abounds it resists the deep diphtheritic impregnation of the tissue for a long time, but when it has taken place resists recovery as well.

The epithelial changes which form the diphtheritic deposit belong principally to pavement epithelium. Where this abounds, the diphtheritic poison is most apt to find a place to rest and develop; thus the tonsils, not only for their prominent location, but also for the structure of their surface, form a fit receptacle and breeding-place. Vibrating epithelium is not so apt to be destroyed. It is higher in the animal scale, and has a more complicated structure function.

Where muciparous follicles abound, their normal secretion, as a rule, prevents deep-seated degeneration of the tissue. Epithelial conglomerations are lifted up from the surface, no tissue takes part in the morbid process to any great extent, the serum of the mucus penetrates the deposit, and disposes it to macerate. Thus the deposits formed in the respiratory part of the Schneiderian membrane are apt to be constantly discharged from the nostrils unless their production is too massive, and the membranes of the trachea are frequently gushing out of the newly-made tracheotomy opening in semi-solid consistency. The frequency of muciparous follicles in the larynx and trachea is also the reason why the numerous

lymph-ducts of the mucous membrane cannot act much on the superjacent, but loosened masses, thus offering a better reason for the merely local character of laryngeal and tracheal diphtheria, and the absence of constitutional symptoms, than that which Hueter offered as an explanation.

The vocal cords are deserving of a special mention. They form the borders of the narrowest entrance into the lungs. Foreign substances, no matter whether of benign or malignant character, will be retained by them. They are supplied with pavement epithelium, which is the principal seat of diphtheritic degeneration. They have no muciparous glands, nor have they lymph-vessels. Thus, if there is any organ predestined for diphtheria, it is the vocal cords. Where there is not poison enough for a thorough infection, there is still enough for a local deposit. Where diphtheria has died out as an epidemic, the stray cases with limited infecting power will be known for years or decennia as so-called sporadic membranous croup, as you would speak for a generation of an occasional case of sporadic cholera, or a stray case of variola. There is not infection enough to poison the throat and larynx and blood, but just sufficient for the most favorable place, the vocal cord. No speedy removal of the diphtheritic mass can be obtained, for there are no acinous glands underneath. No general infection can spread from them, for there are no lymph-ducts to communicate it. Besides, suffocation sets in too soon for the neighboring lymph-vessels to become agents and bearers of infection, in case the deposit would macerate.

Thus, if anatomy and physiology mean anything, I hope the vexed question of "croup," or "diphtheria" in the larynx will be considered as settled.

The distribution of blood-vessels, and more still, of lymph-ducts, is of the greatest importance as far as general symptoms are concerned. Their absence from the tonsils explains the benign character of tonsillar diphtherite; their number and size, and the direct connection with lymphatic glands in the Schneiderian membranes, explain the danger of nasal diphtheria. Sometimes the lymphatics have hardly time or opportunity to act. In the many cases of slight hemorrhage to which I allude at some other place, from the nostrils, absorption appears to take place through blood-vessels directly; in

those cases the usual immense swelling of the glands of the neck is missed, but the effect on the general system is nevertheless developed rapidly.

To the lymphatic ducts and glands I have alluded very frequently. In fact, they are of prominent dignity in a large number of serious or fatal cases. Thus they deserve a few moments' special attention.

The number of lymph-vessels, distributed as they are over bones and fasciæ, blood-vessels and nerves, connective tissue and fat, is almost incredible. The larger ones form a closed system of canals. Their walls consist, like those of blood-vessels, of three layers—an intima, a media, and an adventitia; the first is made up of elastic fibres, with pavement epithelium; the second is muscular and contractile, only thinner than that in the blood-vessels; and the third has a looser connective tissue than the corresponding layer in arteries and veins. The smallest lymph-vessels, like the capillaries of the blood-vessels, claim no constituent to their walls except a pavement endothelium. Whatever connective tissue is lining this simple layer of endothelium, belongs to the surrounding organs, and not the lymph-ducts. Thus they can hardly be thought of, except in the most intimate connection with the fibres and cells of all connective tissue. Thus far, all histologists at the present time agree. The modus of this connection, however, has been explained in the most different manners. Kölliker, for instance, looked for the last distributions of the lymph-ducts in the pointed outgrowths of the connective-tissue cells. Recklinghausen denies the existence of membranes in the finest distributions; according to him the open interstices between the connective tissue or epithelium cells are the first origins of lymph capillaries. Neumann claims the system of lymph capillaries as a closed system of canals, at least as far as concerns the skin, which he has made the subject of a recent monographical study. Its walls, according to him, are lined with pavement epithelium, not interrupted by any stomata, in no way directly connected with open spaces between the connective-tissue cells; their superficial layer consists of the most minute forms. They are just interior to the superficial blood-vessels; their inner layer is larger and sometimes endowed with valves, and they are found in innumerable quantities all through the connective tissue, fat, perspiration

glands, sebaceous follicles, hair follicles—in all of which Teichmann and Sappey were not able to find them—besides the papillae and the whole tissue of the cutis. Thus it appears, from the discrepancies of observations and opinions alluded to as specimens, that the origins of lymph capillaries may vary in different organs. Recklinghausen is positive in his statement (so different from Sappey's) that the most minute terminations in the peritoneal epithelium and on the pleural covering of the diaphragm are open stomata, thus exhibiting the large thoracic and abdominal cavities, as it were, in their character of immense lymph-sacs. Through these stomata the lymph, viz., nutrient fluid minus what is being used for tissue building, plus what has been excreted from the tissues, would be admitted to the smaller and gradually the larger lymph-ducts (the valves of which are diverted towards the heart) under the influence of three motors, one of which is muscular contraction, the other arterial pressure, unbroken by the slow current of terminal plasmatic circulation, the third, central aspiration.

The liquid contents of the tissues, or such particles or ingredients as can be suspended in them, of a gaseous or chemical, or parasitic character, are swept off to the lymph-glands, the peripheric fascia propria of which forms a first resting-place. For here the lymph-vessels are divided in branches, before perforating it and discharging into the lymph-spaces of the alveoli of the cortical layer, which are filled with lymphoid corpuscles composed of coarsely granulated protoplasm. From it the lymph, in thin canals, is swept into the medullary part of the glands, the nature of which is the same as the cortical, with the exception that it is less compact, inasmuch as the connective-tissue trabeculae are less developed, and the lymph-spaces more numerous and larger. The lymphoid corpuscles originally formed in them are swept away with the incoming current, thus increasing the amount getting into the outgoing ducts, which are smaller in number, but larger in size than the incoming ones. Whatever infectious material enters through the vasa efferentia, and is small enough to be swept out with the lymph and the newly-suspended lymphoid corpuscles, will then be introduced into the unimpeded current of the lymph and blood-circulation, those cases excepted in which another obstacle to an uninterrupted flow is found in a second tier of



lymphatic glands. Whatever is of the unirritating character of the lymph, and not larger in its microscopical measurements than it, is swept through the fascia propria and into the reservoirs of the cortical and medullary substances of the gland in an uninterrupted current. But two accidents may happen. The foreign admixture may be too large to pass easily. Then there will be stagnation, irritation, either in the fascia or the trabecles of the substance. The circulation of the blood capillaries will be stopped by pressure, swelling will ensue, proliferation take place, the circulating lymph mix with white corpuscles from the lymph-spaces and the stagnating blood-capillaries, and an abscess, either intra- or peri-glandular, result. Where this is not the end, the foreign material will be retained inside the fascia, in the connective tissue, or the dilated lymph-ducts of the cortical substance. Thus the coloring matter of injected liquids has been found safely stowed away in this external part of the gland, without entering the circulation. Thus the gland, with or without being much disturbed in its own integrity, may form a receptacle for noxiæ swimming with the lymph current. Thus syphilitic or other poisons deposited in the gland may be suspended in their injurious consequences, or when their presence results in irritation and speedy suppuration. Thus they may be eliminated by the timely opening of an abscess.

The glands may be engorged even when the foreign material is not excessive in quantity, but only highly irritating in character, by being of a heterogeneous nature; no matter whether chemical or parasitic. In cadaveric infection the axillary glands will swell to fifty times their original size, they and not the cubital glands, forming the first depot for the majority of the lymph-ducts of the fingers. Thus the glands of the neck swell in diphtheria in a few hours to an unseemly extent. To a certain degree this swelling must be expected to take place whenever anything irritating enters the lymph circulation; the irritation of a simple nasal or oral catarrh results in gradual swelling of the neighboring lymph glands, and many a case of presumed scrofula diagnosticated from glandular enlargement finds its ready explanation in the existence of a chronic catarrh of the nose, or protracted uncleanness of the month. But when irritaments are very small, and very numerous, large numbers

may be swept into the general circulation before resulting in local swelling. When they are very small, and not very numerous, they may pass the lymph ducts and glands for days, and perhaps weeks, resulting in general poisoning rather than in local disturbance. Thus the poisonous detritus, whose elements are ten or twenty times smaller (if at all measurable) than lymphoid corpuscles, may fluctuate to and fro through the blood, interfere with general nutrition, stagnate in the slow side circulation of the white corpuscles in the smallest blood-vessels, increase rapidly, emigrate, form deposits, purulent, septic, and gangrenous, and disintegrate tissue to any extent, before local symptoms are diagnosticated. Not infrequently do we find, that the very mildest cases—apparently—result in the most severe attacks. Sudden collapse and death in diphtheria is generally observed in alleged mild cases, such as I have mentioned fourteen years ago, and it has been my experience and that of many observers, that paralysis will occur in the convalescence in the same class.

Thus the question of mildness and severity of local or general affection appears still shrouded in mystery.

Is diphtheria principally a local, or principally a general disease? Or which form of the two is the more dangerous one?

In 1860 (*Am. Med. Times*, Vol. I. p. 95) I used the following words, which express the opinion, I believe, of many of my professional brethren: "Diphtheria is a general disease; it has local deposits, it is true, but in the same manner that scarlatina will localize itself on the skin, mucous membrane of the Bellinian canals, etc.—measles on the skin and the mucous membrane of the respiratory organs, or typhoid fever on the mucous membrane of the intestinal tract." In most of its bearings the question is, in my opinion, an idle one. Any injury to the system has to pass in through a specified locality. The difficulty to decide through which, is perhaps best illustrated by the dispute concerning the typhoid uoxa entering the organism through either the lungs or stomach. In some cases there is no dispute; whooping-cough is admitted to prove contagious by entering the lungs. Nor is there much dispute on the admission of diphtheria into the system. With the rare exception of those cases in which the vaginal mucous membrane, or denuded cutis or the intestinal mucous membrane proved the first seat of infection, we meet it first on the respiratory mucous

membranes or where respiratory and digestive mucous membranes cross. In the large majority of cases we find local changes as soon as called to see a new case; together with, or in preference to, general symptoms. Seldom are there the latter, particularly fever, without some of the former, viz., that class, which more than fourteen years ago, I described as "diphtheritic fever." Taken for granted that the latter cases exist, how do they originate? The morbid matter, chemical or parasitic, unless retained before descending so far, enters with respiration into the pulmonary alveoli. Their surface, if spread out, would cover 2,000 square feet, under which the immense lake of blood, amounting to one-fifth of the whole weight of the body, is brought into contact with five thousand quarts of air every twenty-four hours. Gaseous, or chemical, admixtures of a poisonous character find no difficulty in entering the circulation as easily, or nearly so, as air. The only separating line between the atmosphere and its contents on one side, and the blood lake on the other, is a single layer of epithelium (sometimes absent), of the alveoli, of 0.003 to .004 lines in thickness, spread over an elastic basement membrane, behind which capillaries of 0.003 to 0.005 lines in thickness are found. All the epithelia of the respiratory organs are cylindrical and vibrating, and as such not apt to permit of an easy entrance of foreign substances into the smallest ramifications of the bronchi. Their function of and success in removing large masses of mucus from the bronchi, in an upward direction, would alone make us infer that the admission of specific solid poisons into the blood through the respiratory organs was not an easy matter or frequent occurrence. At all events, such elements cannot be swept through epithelia lining alveoli and capillaries with the same facility as through air, and the relative slowness with which changes in the epithelium of visible mucous membranes are apt to take place, renders the rapid absorption of poisons through lung epithelium somewhat doubtful on the hypothesis that these poisonous germs were really bacteria.

Thus we should say that in all cases in which a patient is taken ill suddenly, or pretty suddenly, in the course of a few hours, or a day, after having enjoyed entire health, with a high fever and some diphtheritic deposit; remains sick for half a day or a day, or even two, with the same fever, which then

rapidly diminishes and leaves him fatigued and feeble for a few more days, until in the course of five or seven days he feels perfectly well again, we should say that such a case of sudden attack and sudden elimination of the noxa must positively be the result of a gaseous substance or of one soluble in the fluids of the human organism, and not of a solid body. And these are no hypothetical cases, they are to be found every day. It is true they are not all of the same kind; nor is, for comparison's sake, scarlatina. There are rapid cases, slow cases, high fever, low temperatures, large deposits, minute plaques. There is no case which would exclude the possibility of a sufficient explanation on the theory that we have to deal with a gaseous or liquid substance, whether complicated with or attached to bacteria or not, is indifferent, but there are at all events some—just such as I have mentioned—which cannot be explained by the bacteria theory as well.

Other facts might be explained by it, as by the gaseous poison theory. The facility of deposits on prominent elevations, such as the tonsils, would occur in both. The resistance of the vibrating epithelium of the nose to diphtheria is explainable by both. Inhalation takes place through the nares principally, and still while we have a great many cases of nasal diphtheria in the epidemic of this year, we can almost always prove the case to have originated in the pharynx, and ascended. Primary nasal diphtheria is but rare, for the pavement epithelium of the lower portion of the nose is so near the surface, and so frequently in contact with mucus, etc., that the first deposit will not take place there. Facts like the following will admit either theory.

Two boys in a family were taken with symptoms of diphtheria at the same time. One evening the one had slight fever, and severe headache, the other without fever, a deposit on the left tonsil, which was by far the larger of the two. In him both tonsils had been known to be large, in his brother they were small, hardly visible. Next morning the one had a deposit on his tonsils in addition to his fever and headache, the other fever and headache in addition to his diphtheritic membrane.

Fever is not the only symptom resulting from the direct rapid introduction of an irritating material into the blood. In fact, it is safe to assume that high fever—individual peculiarities always excepted—results from rapid absorption of large quantities

only; provided again, that they are of an irritating character. For even septic processes run their entire course without, in many instances, a serious elevation of temperature. Not in all cases, however, have we to deal with large quantities of poison and rapid introduction into the blood. What, in my mind, points to a slow absorption through the blood, of more or less of the poison, and to its distribution to certain centres or localities, are the cases of gradual or sudden collapse and paralysis. The first case of collapse I ever observed has been published in the first vol. of the *American Medical Times*, p. 95. A healthy and robust boy of four years complained of some pain in swallowing, and appeared languid and sleepy. It was in the autumn of 1857, and no epidemic of any kind prevailed in the city at that time. The child did not appear to be very sick; there were very few local symptoms in the throat, a little tumefaction of the tonsils, no particular oedematous swelling, no unusual degree of local hyperæmia, but several small patches of membrane on either tonsil. Pulse ninety, feeble. Moderate temperature of the skin, extremities not cold, skin rather dry and flabby. The child was listless, indifferent, took some food as a matter of course without longing or asking for it. No local pain anywhere, except a slight uneasiness on pressure exercised on the tonsils; bowels rather constipated. Questions were answered intelligibly, but indifferently and slowly. Pupils reacted to the light. No cerebral symptoms whatever, except the slowness of mental function alluded to. No diagnosis except that of pharyngeal diphtherite, as I had not seen a case of general diphtherite at that time. No particular change next day, nor on the third, with this exception, that the child grew more and more indifferent, listless, and melancholy, cared little for anything that was done to rouse and ease him, and appeared to have no desire for or objection to anything. The pharyngeal membranes extended somewhat, but not over a surface of more than two-thirds of an inch in diameter. No progress downwards, no affection of the respiratory organs, no dyspnoea. No appreciable change had taken place on the morning of the fourth day, except that the general adynamic condition of the child was increasing. Thus it kept on, although the child took some food, uttered a few words now and then, answered questions, and retained apparently the full amount of

his intellectual faculties. The temperature decreased, the patient sank more rapidly, and died in the afternoon; no dyspnoea, no perceptible cause of death. Extinction of life like a fire slowly extinguished from want of fuel. Post-mortem examination yielded but negative results. No organ abnormal; general anæmia. Little blood in the vessels, thin, and of a dark color. No diphtheritic membrane in any part of the body except in the pharynx.

I look upon the result of that post-mortem examination as very incomplete. Changes in the tissue were not examined or noticed. It was seventeen years ago, long before Zenker and his successors had discovered and described the granular degeneration and parenchymatous inflammation taking place in most tissues in all kinds of feverish, and particularly infectious diseases. The only important symptom mentioned is the dark color and thin consistency of the blood. The same condition has since been found by other observers in cases of sepsis and sudden death; also extravasations, fragility and granular degeneration of tissues, sometimes accumulation of cells and nuclei between the fibres. Miller and Mosler emphasize in such cases the degeneration of the heart muscle; others, coagulations in the heart, resulting either from insufficient contraction of the heart itself, or from floating thrombi which were formed in distant veins suffering from the general circulatory weakness, sometimes from thrombi formed in the small veins of the neck during the efforts of croupous respiration. Others look for the explanation of the sudden death in the interrupted innervation of the heart. Either the pneumogastric or the sympathetic nerve may be affected, and the symptoms may vary accordingly. A paralyzing influence working in the tissue of the former will accelerate the pulse; a degeneration of the sympathetic heart ganglia renders it slower, and death may finally occur in either condition. It is the same apparent incongruity of symptoms, easily explained, however, which we notice is the common form of fatty degeneration of adults.

We must look upon the changes leading to death, in the majority of such cases, as of the same character, although of different degree, as those belonging to diphtheritic paralysis. It is frequently accepted that the poisonous material, parasitic or chemical, exerts a local influence upon a nerve, or a set of

nerves. Oertel, whose article on diphtheria in Ziemssen's Cyclopædia has suddenly obtained amongst us a notoriety which in my eyes it but partially deserves, takes for granted that diphtheritic paralysis is a progressive peripheric paralysis. He claims that every case begins in the pharynx, admits, however, that diphtheritic paralysis exhibits a very unsteady character, can return to a nerve territory which had recovered, and attack distant territories at once, or gradually. I do not believe that every case of diphtheritic paralysis, many of them appearing when convalescence is fully established, can be explained in the same routine manner. Many of them may be, as they appear to be, identical with the cases of paralysis after typhoid fever, variola, dysentery. In some the paralysis has certainly crept away, as it were, from the first attacked mucous membrane, in others it results from fatty or granular degeneration of muscular fibres (Buhl), or from capillary hemorrhage and waxy disintegration. In some the affection is decidedly central. Thus nuclear proliferation and hemorrhage have been found in the spinal ganglia by Buhl, in the gray substance of the spinal chord, even disseminated myelitis by Oertel. In many it may be due to the facility with which nutritive disorders, local effusions and extravasations occur in conditions of general hydræmia, and insufficient restoration of the blood-vessels, when the progressing convalescence invites to undue over-exertions of the heart. In former years I inclined to explain every case of diphtheritic paralysis upon view. But in a large percentage of cases of diphtheritic paralysis I attribute it to the presence of the morbid substances in the blood and nerve, into which they were received through the lungs, slowly, without much feverish excitement, without many local symptoms about the pharynx or nose. The more fever, the more rapid elimination of the poison. This hypothesis is more than merely plausible for several reasons. It is a frequent experience that paralysis will follow a case of diphtheria with pharyngeal or nasal symptoms, when but little developed. Where they are well marked the temporary paralysis of the soft palate, which Oertel takes as the regular starting-point of the affection, is frequently observed. It results partly from œdematous suffusion of the tissue, partly from diphtheritic affection of the motory branches of nerves distributed in them. But serious paralysis of

distant nerves will rarely follow. On the contrary, the paralysis of the superior and inferior laryngeal, the ciliary, facial, the optic, the spinal nerves of both trunk and extremities, are usually met with after cases of diphtheria, which ran their course in a short time and with but few local symptoms. The very fact that the paralyzed nerves need not necessarily belong to the same neighborhood or territory appears also to prove that the circulation is the highroad on which the poison enters nerve-centres, or peripheries, without regard to tonsils or palate. While Oertel, then, assumes that bacteria mine their way through the tissue, I find it easier to believe, and more in accordance with clinical experience, to assume that a slow admittance of the poisonous elements to the blood, in constant succession but relatively small numbers, yields a readier explanation of that much dreaded symptoms.<sup>1</sup>

The questions regarding prognosis are twofold.

1. Which class of persons are apt to be infected with diphtheria?

2. Which class of cases are apt to prove serious or fatal?

1st. Most infections and contagious diseases are observed amongst infants and children. Scarletina, measles, whooping-cough, diphtheria, are mostly seen at that period of life. Typhoid fever is not a rare disease; but it is as frequent in adults as in children, and more serious. In the new-born it is exceedingly rare; there are but four doubtless cases on record. The fifth

<sup>1</sup> Let me here illustrate my opinion of Oertel's article, which is by no means his best work, nor even an addition to our knowledge of diphtheria—after his own previous and other elaborate researches—but has done more than anything else to make his name known amongst the profession, and the public who are never satisfied with anything less than a surprise, or a panic. I allude, as an instance of his methods of reasoning and teaching, to his remarks on the treatment of diphtheritic paralysis. He recommends the interrupted and the galvanic current, warm salt-water, sea and sulphur bathing. Of internal remedies he rejects *nux vomica*, declares it to be positively injurious, and in its subcutaneous administration abominable. And why? *Nux vomica* acts through the nervous centres only, therefore, “at the best,” it injures the patient. May we ask: What does *nux* at its worst when “at its best” it injures the patient? Besides, the theory of the efficacy of *nux* is not so safely established that it can subvert general experience. And general experience is in all countries unanimous in the praise of *nux* in cases of diphtheritic paralysis. This is one of the remarks in which our author's clinical experience is insufficient, and, at all events, inferior to his powers as a histological observer and describer.



was reported by me, and specimen of intestine shown—baby died when sixteen days old—two years ago in the Obstetrical Society. Throughout childhood the cases are mild, getting more severe with advancing age. I believe this is so, because in very early infancy part of the lymph system, particularly Peyer's plaques, are very undeveloped, and because of the superficiality of inhalation, probably also because of the rapid metamorphosis which enables infants to rid themselves, while slow infection is going on, of a large portion of the noxa. Measles, scarlatina, whooping-cough, are rarely met with beyond the age of twelve or fourteen, because of their having occurred before, and their return being but exceptional. Diphtheria is rare under eight or ten months of age, more frequently before the third, than between the third and sixth or seventh month. Childhood is more liable because of their greater softness and moisture of tissue, their larger number and size of lymph-vessels (Sappey emphasizes the fact that in the young the lymph-ducts of the pharynx are easier to inject than in the adult), their greater tendency to nasal, and especially to mouth catarrh—from want of cleanliness, as far as removal of nasal mucus and remnants of food is concerned, and principally because of the excessive relative size of the tonsils. There are few infants and children where the tonsils do not overlap the pillars of the palate; the roominess of the fauces is relatively little; these large tonsils cease to be annoying only when toward puberty, the fauces enlarge without contemporaneous enlargement of the tonsils. Infants from two to eight months are almost exempt from diphtheria because of the large amount of secretion, slightly acid, in their mouths. Even thrush, with its *oidium albicans*, is rare at that age; transmigration, or rather attachment of immigrating poisoning substances being prevented by this acid.<sup>1</sup> The majority of cases below seven or eight months, which have come under my notice—two cases of pharyngeal and laryngeal diphtherite in the newly-born included—were under two or three months. Liable to be infected are further

<sup>1</sup> It is probable that the diphtheritic poison attacks the conjunctiva so rarely for the same reason, viz., because of the copious lachrymal secretion. It may, however, be merely accidental that I have seen more cases of conjunctival diphtherite twelve or fifteen years ago than at present. It is probable that such patients avail themselves at once of the increased facilities for the treatment of eye diseases.

all those whose mucous membranes, respiratory and digestive, that have been in a condition of chronic catarrh. Catarrh of the mouth, with caries of the teeth, pharyngeal and nasal catarrh, congenital and acquired enlargement of the tonsils, exposure to cold air, to inhalation of dust, excessive screaming, canterization, are just as many invitations extended to the diphtheritic poison.

Which locality yields the better or worse prognosis? Affection of the tonsils is decidedly favorable; of the larynx, for reasons amply set forth, decidedly grave, almost always fatal; of the nares grave. The narrowness of the infant's and child's larynx induces suffocation; the adult larynx is large enough to permit the diphtheritic deposit to assume a septic character. But once in my life have I been called upon to perform tracheotomy in an adult for membranous croup. The nares have been spoken of as dangerous ground. The large number of lymph-ducts, and neighborhood of lymph glands, the large number of superficial blood-vessels, and the facility of absorption, the liability to putrefaction through exposure to moisture and air of all the contents of the nasal cavity, and the inhalation and of the fetid smells, explain the fact of nasal diphtherite being so grave. But it shows unacquaintance with the facts, as in Oertel's essay alluded to before, when he assumes that it is almost always fatal, and unacquaintance with the proper treatment on the part of a celebrated Paris authority, when he was heard to say in his wards, but a few years ago, that nasal diphtheria was always a fatal malady. It is apt to be so when not properly treated; its mortality is not grave, when timely and regularly attended to; but this attention must be *timely* and *punctual*.

Which form of the disease is the most grave? Next to the attacks involving laryngeal obstruction, ranks the septic and gangrenous form of diphtheria, whose dangers are in proportion to the rapidity of absorption and inhalation. But the mild form may change into the severe, and therefore the prognosis is never a safe one, until the process is fairly near the end of its full course; and then even relapses may take place.

The condition of the general system is of great importance. Large wounds are liable to become diphtheritic. I have lost two patients of wound diphtheria after exsection of the hip.

joint; one was taken while in fair recovery, in the third week after the operation; one was attacked, a day after the operation, with scarlatina and diphtheria. General anaemia is a bad complication, as is also starvation during the course of the disease. In a condition of hunger or abstinence the absorbing lymph-vessels are found full and active, and the chyle-vessels empty. During digestion the latter are full, the former empty.

Low or high temperatures, when observed but once, give no special prognosis. Of low temperatures in dangerous cases I have spoken before. High temperatures and other grave reflex actions, vomiting, convulsions, may occur without meaning much harm unless they last long. A few days ago the first temperature taken by Dr. Conrad in the axilla of an adult and robust patient, who had complained since the previous evening only, was  $107^{\circ}$ . The local deposit was but small. In eighteen hours the temperature was  $102^{\circ}$ , in a few days normal; evidently elimination was as prompt as the absorption of the poison. In such cases a vigorous action of the heart is surely as positive a safeguard as is a feeble circulation a danger.

Liability to glandular swelling, or the presence of enlarged glands, with a tendency to press on the jugular vein, tends to increase cerebral symptoms. Complication with measles or scarlatina is frequent, especially with the latter. The course generally taken by diphtheria complicating these diseases illustrates beautifully the tendency arising from previous conditions of the mucous membranes. Diphtheria in measles, with its catarrh of the respiratory organs, is apt to terminate in membranous croup of the larynx; putrid bronchitis, however, is rare because of the very antiseptic character, to a certain extent, of carbonic acid. Scarlet fever, however, with its localization on the digestive mucous membranes, is but rarely followed by laryngeal diphtheria, while the malignant forms of throat diphtheria are numerous.

Hemorrhages from the throat prognosticate badly. They prove destruction to a certain depth, and prophesy a rapid progress of the process, perhaps with absorption. Fortunately the number of such cases is but small, and a goodly number of them even, as long as no general purpura sets in, are not fatal. Pneumonia is a serious complication. Of its presumed origin from immigrating bacteria I have spoken. Broncho-

pneumonia may result from atelectasis (as œdema from swelled blood-vessels) in the impeded respiration of laryngeal croup. Pneumonia may result from the aspiration downwards of decomposed materials. Embolism results from thrombi in small veins, either near the larynx in croup, or in other parts from debilitated circulation, or by portions of a heart clot torn away.

Nephritis is not an unfrequent complication, although albuminuria is more so. The presence of albumen is frequent enough. It may result from high temperature only, and then contains but few or no tissue elements, or from swelling and fatty degeneration of the kidney epithelium, as in other acute infectious diseases, or from venous stagnation during the course of membranous croup.

If, at the conclusion of this paper, I venture to speak of the therapeutics of diphtheria, I may be permitted to say a few words in my excuse for appearing commonplace and trite. For in truth, the remedies which I use are so simple in character and so few in number, that I should hardly risk to speak before you were it not that I feel that I have always tried to stand on the safe ground of a sound pathology. Many a case of diphtheria I have not attended, because I believe I have prevented it. I do not speak of those members of a family who if exposed would have fallen sick, but who were protected by isolation of a patient under the same roof. I speak principally of the preventive apparatus in the hands of every family practitioner. I look after the mouth and pharynx of the children in my acquaintance as a regular thing. Eruptions on the head must be removed, and glandular swellings around the neck thereby cured or prevented. The same is done for nasal catarrh and catarrh of the pharynx in the good season, where the prognosis of your treatment is more propitious. Hypertrophied tonsils must be excised at a time when no diphtheria prevails. For at such times every wound is apt to become diphtheritic; and hardly any operation inside of the mouth will heal without turning diphtheritic. For the same reason I postpone any sort of bloody operations during the epidemic of diphtheria, if barely possible. But lately I have seen the wound of an operation for cystocele, performed by one of our most prominent operators, in a house where there was no diphtheria before, to turn diphtheritic and jeopardize the success of the operation.

As a further means of preventing disease I may at this juncture speak of a remedy. I allude to chlorate of potassa and chlorate of soda. I cannot say that I place much reliance on it as a remedy in diphtheria, and still I give it in almost every case. The chlorate is the remedy eminently fit for most sorts of stomatitis. The large number of cases of stomatitis and pharyngitis during a period of diphtheria, and their usual complication with and initiation of the diphtheritic process justify and require its use. I give it, then, for its effect on the inflamed mouth and pharynx, but not for diphtheria. It acts as a preventive by returning the mucous membrane to a normal condition. Nor do I administer much more in cases of mild tonsillar diphtheria. As this is a benign affection, it is of greater importance to prevent it from spreading than to remove it from the tonsils, where its communication with the systems of blood and lymph vessels is so very limited. In order to have the full effect I insist upon frequent administration. Doses ought to follow each other in rapid succession. At least every hour, every half-hour, every quarter of an hour sometimes, ought a small dose to be given to keep up a constant contact of the endangered mucous membrane with the remedy. From half a drachm to a drachm may be given during the twenty-four hours. As many families are acquainted with the remedy, and use it without being bidden, see to it that the dose is not too large. The death of Dr. Fountain, of Davenport, Iowa, and many others from overdoses of chlorate of potassa ought to be heeded.

My views on the treatment of diphtheria have been framed in strict accordance with the opinions I have expressed in regard to its pathology. Although finally a constitutional disease, it is at the beginning nearly always local, or, in other words, infection enters the blood at a limited portal, which is the same in the great majority of cases. From this point of view constitutional diphtheria is analogous to the septicæmia of wounded men and of puerperal women, and the local disinfection, which has been accepted as the sheet anchor in the treatment of these affections, must be also the main reliance in that under consideration. We may congratulate ourselves upon this fact, since we do possess some positive knowledge in regard to the disinfection of accessible putrid fluids, while it is safe to say

that as yet we have no proof of our ability to disinfect the blood of the living body. We seem indeed to be able to some extent to increase its power of resistance to the action of poisons that have been absorbed into it, but we cannot affirm that our remedies act by destroying the poisons themselves. I shall refer to this again in speaking of quinine.

Local remedies may be divided into three classes. 1st, those which dissolve the false membranes, and thus facilitate their removal. 2d, substances modifying the surface from which the membrane has been removed. 3d, disinfectants, equally capable of arresting chemical changes, and of destroying animalcular life, and applicable therefor, whichever theory be finally adopted to explain the infectious properties of the diphtheritic exudation.

1ST CLASS.—The rapid solubility of the false membranes is chiefly important when they occupy the larynx, and thus in my paper on croup I have dwelt especially upon this class of agents. Those which still hold the first place are lime-water, glycerine and moist heat. The latter is claimed to be particularly effective. I admit it softens pseudo-membranes like anything else, furthermore it may increase the secretion of acinous glands, and thereby raise and expel membranous deposits. But the fact that it softens healthy tissue as well as morbid exudations appears to facilitate the penetration of the poison into deeper layers. Both of these theoretical views ought to be remembered to guide the practitioner in an individual case. In the majority of cases the application of ice will be found more in accordance with the requirements of the secondary inflammations and enlargements.

The remedies in the 2d class that have been most largely employed are, with the exception of chlorate of potassa, all more or less astringent. It is a noteworthy fact, however, that the pure astringents, alum, tannin, nitrate of silver, formerly employed in diphtheria, and still retained in the treatment of simple catarrhal pharyngitis, have been generally abandoned as remedies for the exudative disease. Oertel objects to astringent gargles on the theoretical ground that, instead of facilitating the separation of false membranes and the destruction of micrococci, they tend to arrest the formation of pus, and even favor the wandering of the infectious elements into the

submucous tissues. From what has already been said, it is plain that I do not commit myself to this, or to any other theory of Oertel's, but I am willing to admit that experience has pronounced against the efficacy of the pure astringents, and for my own part I never employ them.

But the substance which to day is ranked among the most powerful of all astringents, the perchloride of iron, is, on the contrary, a remedy which, when suitably handled, most decidedly merits confidence. Muriate of iron was first employed in diphtheria from an alleged analogy between this disease and erysipelas, in which this drug had been found to render real service. It was used in France by Velpeau, and in England in 1851 by Hamilton Bell, in the treatment of erysipelas, being applied locally, and also administered internally. In 1858 diphtheria was treated by the perchloride in France by Gigot, and the following year by Dr. Crichton in Scotland. In 1865 a report was made in Melbourne, Australia, by Richardson, of 220 cases of diphtheria, observed during a period of seven years, and treated since 1861 exclusively by full doses of the muriate of iron, together with chlorate of potassa in powder. The number of deaths was 18, or 8.2 per cent., very little in excess of that of measles. Since these first experiments British and American Journals have abounded with reports of success obtained by the perchloride of iron, and in a recent monograph Schaller has asserted that "the dilute muriate of iron is to be preferred to all other remedies in diphtheria."<sup>1</sup> I have extensively used that remedy myself, have, in fact, mentioned it amongst those employed by me, in the first paper of mine alluded to before, after some considerable experience with it extending over the years 1858, 1859 and 1860.

The mode of administration of the muriate is of the utmost importance. To insufficient doses, or careless applications, may be traced many of the cases of failure. Thus Steiner of Prague is believed to have refuted Schaller's assertions by experiments on four children, to whom was administered hourly a teaspoonful of a mixture containing five to eight drops of the tincture to three ounces of water. Local applications were made three and four times a day of a mixture containing thirty drops to two ounces. The two youngest children, one and three

<sup>1</sup> Reviewed in Schmidt's *Jahrb.* 149, p. 339, 1871.

years old, died by extension of the disease to the larynx, the two others recovered.

To be of any efficacy muriate of iron must be given in large doses frequently repeated. From five to fifteen drops every quarter, half, or every hour, is a dose that alone fairly tests the effective powers of the medicine. Gargles and direct applications to the pharynx may be dispensed with, and their irritating effect avoided, since the throat is sufficiently washed by swallowing. According to the testimony of all observers, and with which my own observations concur, the muriate does not facilitate the separation of membranes, but seems to act upon the surface from which they have been removed, lessening the hyperæmia, reducing the swelling, and seeming to limit the reproduction of the exudation. But how does the action of the perchloride differ from that of any other astringent? Although all astringents coagulate albumen, there is no question but what the albuminate formed differs notably in different cases. In some comparative experiments, made before the class of the Woman's Medical College of the Infirmary of New York by Dr. Mary Putnam Jacobi upon the white of egg, with alum, tannin, creasote, acetate of lead, carbolic acid, and perchloride of iron, marked differences were observed in the density of the coagulums formed. The tannin produced a cloudy, diffused coagulum; carbolic acid also a diffused coagulum, but only after one-half a minute; alum a tenacious clot that sank to the bottom of the test-tube without increasing in size; three drops of creasote instantaneously formed three dense curds, each of which sank separately, increasing in size like a rolling snowball; perchloride of iron gave a layer of coagulum a few lines in thickness that sank very slowly, leaving the fluid clear above it. When subcutaneous veins were exposed on a living rabbit, and touched with a drop of perchloride, no visible effect was produced for over a minute; then they were seen to markedly diminish in calibre; while a drop of creasote formed a coagulum that instantly obliterated the vein by compression. This second effect was mechanical; the first implied that the perchloride acted by exciting the vital contractility of the blood-vessel.

Nitrate of silver, which when applied to a mucous or a serous membrane is reduced and deposited in the albuminous cement



between the epithelial or endothelial cells, cannot be compared in its action to the perchloride of iron, or rather this latter cannot be compared to it. It seems probable that one of the first ways in which the muriate modifies the diseased mucous membrane is by reawakening the contractility of the paralyzed blood-vessels. The restoration of their tone would itself diminish the rapidity of putrid absorption by the lymphatics, which we have seen to constitute the great danger of the disease.

Has the perchloride of iron any more direct effect upon the lymphatics?

Such an effect, which was clearly or vaguely assumed when the muriate was transported from the therapeutics of erysipelas, with its predominant inflammation of the cutaneous lymphatics, would indeed be a grand desideratum. It must be confessed, however, that we know little about the matter at present, although from analogy we may believe that a local astringent to blood-vessels would not leave the dilated lymphatics uncompressed. Such compression would oppose a powerful obstacle to the free course of the poisonous particles that are streaming onward towards the torrent of the circulation.

The perchloride of iron, like the sulphate, is a tolerably powerful disinfectant. It is well known that all astringents in sufficiently large doses are disinfectants, and some of the best disinfectants, as creasote, are powerfully astringent. It was used in the treatment of wounds by Nunnely, and is strongly recommended by Beale, especially when associated with glycerine, as a most powerful antiseptic. According to this author, it acts by arresting the growth of bioplasm, which constitutes the soft, pulpy, unhealthy masses that cover ulcerated surfaces. It is equally capable of arresting the movements of bacteria and micrococci, or of coagulating albuminous ferments, so that its action is conceivable according to either of the three great reigning theories of local putrefaction.

In experiments on the disinfection of London sewers, 2.27 litres of chloride of iron were found sufficient to deodorize 30,000 litres of foul water; while for the same purpose 1.36 kilograms of chloride of lime and 36.35 pounds of lime were required.<sup>1</sup> The chloride of iron was included long ago in

<sup>1</sup> Schmidt, Vol. 133, p. 122.

Chevallier's list of disinfectants, and is ranked, with other metallic salts, by Herbert Barker, among those substances which chemically destroy the noxious body.<sup>1</sup>

It is unquestionable, however, that the internal administration of the perchloride is of at least equal importance with its local application. The absorption of the muriate of iron into the blood, and its action after absorption involves many problems that are as yet imperfectly solved. Several interesting suggestions have been made, however, that are worth considering in the bearing on our subject.

1st. It has been said that the perchloride was decomposed immediately after injection, and that the hydrochloric acid alone entered the circulation. But the free acid has not been detected in the urine any more than the entire salt. There is reason, on the contrary, to believe that the perchloride *is* absorbed, and with unusual rapidity, directly from the stomach, the subsequent appearance of iron in the fæces being due to the re-elimination of the metal by the intestines.

2d. Quinke<sup>2</sup> found that, by injection of the perchloride of iron directly into the veins of animals, emboli were rapidly formed in the pulmonary vessels by coagulation of the blood.<sup>3</sup> But if the injection was made very gradually, so that the conditions more nearly corresponded to those of absorption from the stomach, only very minute precipitates *were formed and taken up by the white blood corpuscles*, existing in great abundance in them. This observation, if accurate, may be of importance in explaining the effect of the muriate in septic diseases, accompanied by increased activity of the lymphatics, and an excess of white blood corpuscles.

3d. Saase<sup>4</sup> has modified the common opinion in regard to the influence of iron and the oxydation of the blood, by ascribing to iron salts the property of converting oxygen into ozone. In the circulation they share this property exclusively with the blood corpuscles, and hence are able to supply their

<sup>1</sup> On Deodorization and Disinfection, Hastings Prize Essay.

<sup>2</sup> Arch. für Anat., 1868, Schmidt, Bd. 143.

<sup>3</sup> Dr. M. Putnam Jacobi has observed the same thing in fifteen minutes after ingestion of large doses of solution of tannin. Experiments not published.

<sup>4</sup> Schmidt, Bd. 126, 1865.

place to a certain extent. "Until oxygen has been ozonized," observes Saase, "it is as useless for the purposes of respiration as pure nitrogen."<sup>1</sup>

That iron increases the oxydations in the body has been shown by Pokrowsky, who proves that even in health the heat of the body is raised and the amount of urea in the urine increased by its administration.<sup>2</sup> In anæmic subjects these effects *precede* any increase in the number of blood corpuscles, and hence cannot depend on their renewal. The iron does indeed seem to partly supply their place.

That such substitution, if effected, could not fail to be eminently useful in those poisoned conditions of the blood where the red blood corpuscles are incessantly menaced with destruction is evident.

4th. It has finally been affirmed that, among all the preparations of iron, the perchloride is especially distinguished by a capacity for stimulating the nervous system; probably by increasing the arterial tension in the nerve centres. It is said that its remarkable efficacy in nervous chlorosis, as distinguished from true anæmia, is an illustration of this.<sup>3</sup> If this be true, we may perceive another mode of action in diphtheria in assisting to sustain a nervous system incessantly threatened with local paralysis or general collapse.

I pass to the *3rd* class of local remedies, the disinfectants proper, especially carbolic acid.

It would be quite superfluous in this place to relate or to criticize the vast mass of experiments that have been made to test the disinfecting properties of carbolic acid. Probably nothing is better proved in therapeutics to-day than the fact, that suitable solutions of carbolic acid will arrest putrefaction, kill bacteria and microzyma, and immobilize white blood corpuscles. The great value of carbolic acid as a local disinfectant in diphtheria, as in puerperal septicæmia, cannot be adduced as a proof that the local process depends on the presence of animal germs. These indeed abound in the mouth in the absence of any disease whatever.<sup>4</sup> But carbolic acid exercises a powerful action

<sup>1</sup> I have not had opportunities which would be sufficiently conclusive to test inhalation of pure ozone.

<sup>2</sup> Arch. Virch., Bd. xxii.

<sup>3</sup> See Anstie on Neuralgia.

<sup>4</sup> Beale, Disease Germs, p. 290.

on the life of all vital elements, and therefore upon that of the rapidly proliferating epithelium which constitutes the diphtheritic exudation. It has been experimentally proved to destroy the power of vaccine lymph. It is therefore probable that carbolic acid may also destroy the unknown poison of diphtheria.

In regard to the antiseptic effect of quinine I think that, if exerted, it can only be by immediate contact with the false membrane, and not after absorption into the blood. In Binz's experiments a solution of pure quinine was used, containing from 1 per cent. to 1 pt. in 1,000 of the alkaloid, and this sufficed to prevent the development of bacteria in putrescible fluids. But even in this smallest proportion a patient with 18 lbs. of blood would require to carry in his circulation 133 grains of quinine to realize the conditions of Binz's experiment. The author himself insists that only 2 grms.=32 grains a day should be necessary for a man of 120 lbs. weight, but this calculation is based upon experiments on dogs, where injections of quinine have averted septicæmic fever, and not on the experiments with putrid fluids. However, it is important to remember Binz's assertion that, as an antiseptic and antipyretic, the acid sulphate is the worst preparation of quinine that can be used.

In mild cases of tonsillar diphtheria I sometimes try to remove or to destroy the membrane where it is easily accessible. I insist upon this latter clause, because probang and solid stick and mineral acids have, in my opinion, done much more harm than good. Where I cannot reach the diphtheritic deposit and touch it thoroughly, usually with concentrated carbolic acid, I let it alone altogether. The experience is not new that abrasion of the mucous membrane and injury to the epithelia will spread the process in a very short time. The remarks I made in the course of this paper on the vulnerability of the pharyngeal mucous membrane, the tendency to spread on the part of the disease, and the danger of making new wounds, justify that practice. Thus most of my simple cases of tonsillar diphtherite take frequent and small doses of a chlorate, combined with lime-water, or tinct. ferr. mur. 3 ss.—3 ii. a day, and generally mixed with a little glycerine, principally for the purpose of keeping the remedy in longer contact with the diseased surface, if not for its own anti-fermentative effect. There is seldom any fever which requires attending to, and rarely but little swell-

ing of the neighboring glands. Where there is I use cold water or ice applications, for reasons which I need not here explain after having spoken of the secondary process in and round the lymphatic glands.

At the other end of the list of diphtheritic affections we meet with laryngeal diphtherite, membranous croup. I have nothing to add to my remarks made before you more than six years ago, if it is not that my success in former years, if not with internal treatment, at all events with the ultimum refugium, tracheotomy, has not continued to the same extent. Since 1868 I have saved but a very small percentage of suffocating children, and still I cannot but stand by my former indication for the operation. It must not be omitted when obstruction in the larynx threatens to be the cause of death by suffocation. No complication of disease or epidemic influence ought to be a contra-indication. As in former years, I have used ice externally, an occasional emetic when required, lime inhalations, lactic acid spray.

Every individual case ought to be treated on general principles. Thus fever ought to be reduced by washing, bathing, and remedies by no means exclusively adapted to diphtheria, increasing debility obviated, collapse attended to, severe reflex actions, as vomiting or convulsions, relieved. Whether ether, wine, brandy, champagne, camphor, musk, ammonia, and coffee are to be selected, the individual case teaches better than a lecturer. All of these means are frequently unsuccessful, because they are given too late and in too small doses. Whatever is to be done in a severe form of diphtheria must be done early. If I have reason to be satisfied with my success it is because I have lost no time. More than anything I prize attendance to feeding. Remembering the greediness of lymph-vessels when the chyle-vessels are not supplied, I feed as well as the digestive powers of the patient will permit, always, however, recognizing the fact that the stomach of a feverish patient must be carefully looked after. In most cases of high fever meat diet will neither be relished nor tolerated.

I turn to another class of diphtheria, in which everything depends upon doing the right thing at the right, that is, the early time. I shall, for the pathology of nasal diphtheria, refer to my former remarks. I repeat only this one, that most cases

originate in the pharynx, and reach the nose by ascending. Where an occasional case is first established in the nose it shows itself very soon by a peculiar thin flocculent discharge, sometimes not at all copious, and by very early swelling of glands round the neck. In both of these classes of cases the local treatment has to be commenced at once, and in the large majority of cases the treatment will be successful.

What are the dangers of nasal diphtheria? Rapid absorption, putrefaction, inhalation of foul smells. The indications are clear enough. The surface of the nares *must be cleaned and disinfected*. When you begin early, you reach those layers of epithelium which form the original lesion. Then disinfection is successful, and your injection will wash the surface clean. No strong disinfectant is required. Two or four grains of carbolic acid to the ounce of water is sufficient and mild enough not to be abhorred more than lukewarm water would. Injections must be made into each nostril until the current comes free through the other nostril, or through the mouth, every hour, or oftener if necessary. At the same time care must be taken that some of the liquid reaches the fauces.<sup>1</sup> The fear of otitis I have not. Probably the Eustachian tube is closed by catarrhal or diphtheritic swelling. The mouth ought to be kept open. I have never seen any difficulty arising from my injections. A common syringe suffices; but an ear syringe frequently filled is better adapted to the nursing powers of most attendants. A nasal douche, a fountain syringe is much better, the current more uniform. I have now and then seen neglected cases in which an injection would not open the closed-up nares. In such cases I have used probes and pincers to remove the coarsest material, in the same manner as I, although averse to meddling with the infected mucous membranes, have had to remove large and thick membranes from the uvula, or palate, when deglutition was interfered with. Every hour, or every half hour, is not too often. The child, frequently with swelled glands, head thrown back or sideways, is suffering more, and sleeping less, from the obstructed nares and fauces than when the injections are regularly made with certain relief. I have found many children insisting upon their frequent repetition. Often have swelled glands diminished in size within twenty-

<sup>1</sup> For that purpose the nostrils must be momentarily compressed.

four hours after the commencement of the local treatment. If it was objectionable, or a discomfort, the objection would not count. There is but one way to save a case of nasal diphtheria, that is, by disinfection, and washing of the parts.

What disinfectant is preferable? I avoid those which stain, and those which coagulate. For that reason I avoid the local application of the sub-sulphate of iron, and also the permanganate of potassa. I have generally used carbolic acid. Where there is no smell, I have often used lime-water, pure or somewhat diluted, for its solvent effect.

Internal disinfectants, antiseptics, are of no effect unless the source of the sepsis is stopped, no matter whether hyposulphites, or carbolic acid, or quinia. With the local attendance the large majority of cases will recover; without it they will die. The mortality need not be large. I admit it is difficult to procure just that punctual and sometimes apparently cruel attendance which is required. It is more cruel, however, to sacrifice than to save.

The panic, in my opinion, in the city is absolutely unjustified. It is the result, not the cause, of sensational newspaper articles. Let the public understand that, with the exception of a limited class of almost absolutely fatal cases—as far as our knowledge now goes—there is no infectious disease that can be more readily and more successfully managed than diphtheria, and that its mortality ought to be small. Let them understand that, and the panic will be over.

There is one point to which I wish to return. A case of diphtheria, mild or severe, ought to be attended to at once without loss of time. In connection therewith I will admit that a good deal of “stamping out” has been done amongst us, and I understand diphtheria to have been selected as the next victim of our Board of Health. I propose one measure which will be more successful than the disinfecting of infected houses. Let, for the time being, every district be supplied with a physician, who shall be well paid by the city, who is a beginner in practice, and has ample time, whose residence and business shall be advertised in the papers, schools and police-station houses, and let it be understood that he will at once, when called upon, look after the throat of every pauper or tenement-house child with symptoms of either diphtheria or pharyngitis. And we shall hear less and less of the ravages of the scourge.

## FOUR CASES OF ECHINOCOCCI IN THE FEMALE PELVIS.

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AND

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IN Klob's Treatise on the Pathological Anatomy of the Female Sexual Organs we find only two organs mentioned as the seats of this entozoon—the ovaries and the uterus. Inasmuch as the presence of echinococci in the ovaries is not satisfactorily established by him, and we are not in position to confirm or refute his opinions, we will pass them by without comment.<sup>1</sup> On the other hand, a more careful examination into the statements made by him and other authors about echinococci of the uterus will not prove devoid of interest.

On page 195 Klob makes the following assertions: "Many descriptions have been given of hydatids in the womb, all of which properly relate to hydatid moles; a mistake between the two has undoubtedly been made in these instances. The only fully authenticated case is, in my opinion, that of an acephalocystic vesicle in the uterus reported by Rokitsansky." A search for this case in the latest edition (1861) of this author's treatise on pathological anatomy will prove futile; but possessors of the old edition of 1842 may deem themselves more than usually fortunate, for it rarely happens that old editions are fuller than the more recent ones. We will quote the passages, bearing upon our theme, from the two editions:

"Cystic formations are extremely rare in the uterus; not a single instance has yet occurred here (Vienna), and *but one instance of acephalocystic vesicles in the uterus has come under my personal observation.*" Edition of 1843, III., p. 538.

"Echinococci have been observed (in the uterus) in a few rare cases with perforation of the cyst and extravasation of the

<sup>1</sup> O. Petit reports the only known case of echinococci in the ovary. Observations, Pathol. Anat., 19-22, Tab. III., 7-11.



vesicles into the internal organs, or their discharge through the vagina (Hislop) or into the peritoneal cavity (Wilton).” Edition of 1861, III., p. 500.

What inferences are to be drawn from a comparison of these two paragraphs? Have we not a right to conclude, from the entire absence of details in the earlier and the complete omission of this “fully authenticated” case in the last edition, that Rokitsansky has become dissatisfied with the scientific accuracy of his old observation, and virtually retracts his former statement.

Turning now to Hislop's' cases, they are related briefly as follows: The first was that of a girl, 17 years of age, who had been ill for six months; her catamenia, till then regular, had ceased; in their place she had had an occasional discharge of an offensive bloody fluid. As her condition aroused suspicions of pregnancy, she was examined. The hymen was found intact, the os uteri somewhat patulous, and within the womb a mass, that felt soft to the touch. As all signs of pregnancy were wanting, an ineffectual attempt was made to expel the mass from the uterus by means of ergot. A catheter was finally introduced into the organ, causing the expulsion of a large quantity of bloody serum and purulent masses of very offensive odor. Pains set in during the night, and after repeated doses of ergot the woman gave birth to a filamentous mass filled with numerous large hydatids. She made a perfect recovery, married subsequently, and had children.

A second, quite similar case, was that of a woman 26 years old, the mother of several children. She suffered for some time from constant bloody discharges and pain in the back and thighs. She would not admit the possibility of pregnancy. As various styptics failed to arrest the hemorrhages, and her condition did not improve, the os uteri, which was fully closed, was dilated by means of a sponge-tent, a hand inserted, and a soft mass severed from its attachment to the uterine mucous membrane. The administration of an infusion of ergot, gallic acid, and a good diet, soon restored the patient to health. The mass expelled was likewise filamentous and contained many hydatids.

<sup>1</sup> P. B. Hislop, Details of Three Cases of Hydatids of the Uterus, with Remarks, *Monthly Journal of Medicine*, April, p. 326.

The third patient was a woman, 48 years old, who, after a ride in an omnibus, had a severe flooding and uterine contractions. The os uteri gradually dilated, but this act not being followed by the expulsion of the tumor, owing to its broad attachment, the latter was extracted with the hand. In spite of several subsequent hemorrhages the patient gradually recovered.

Hislop gives no data in the reports of these cases, which can satisfy us that he was correct in calling these cysts true hydatids, and not hydatid moles. A woman's statement that she cannot be pregnant, and even the presence of a hymen, have so often proved fallacious guides in the diagnosis of pregnancy that they have but little weight. In addition, we are not told that any search was made with the microscope for hooks or vesicles in the fluid—the only perfectly reliable tests of echinococci. On the other hand, the masses are represented as being *filamentous*, and as attached to the uterine walls, not buried in them, as true hydatids would probably have been. These facts constrain us to agree with Van Will,<sup>1</sup> Veit,<sup>2</sup> Haussmann,<sup>3</sup> and Klob,<sup>4</sup> in refusing to recognize them as cases of true hydatids. This opinion is strengthened when we reflect upon the improbability of three cases occurring in the practice of one physician, when the most experienced pathologists have never met with a single instance.

Wilton's case is less vague, but here again we have not the convincing proofs that might have been adduced. The first symptoms were metrorrhagiae of twenty-four hours duration, occurring after weekly intermissions and labor-like pains that gradually increased in intensity until a fluid was expelled in spurts. After the lapse of three months the patient died suddenly with symptoms of internal hemorrhage. At the autopsy Wilton found in the upper part of the uterine walls a considerable mass of hydatid cysts, a part of which projected freely into the cavity of the womb, and a part formed irregular elevations on the outer surface of the organ; a perforation at one point here had led to a fatal hemorrhage into the peritoneal cavity.

<sup>1</sup> Canstatt's Jahresbericht, IV., p. 230, 1851.

<sup>2</sup> G. Veit, Krankheiten der weiblichen Geschlechtsorgane. Erlangen, 1867.

<sup>3</sup> D. Haussmann, Die Parasiten der weiblichen Geschlechtsorgane, Berlin, 1870.

<sup>4</sup> Loc. cit., p. 195.

If this was an instance of true hydatids it disproves Davaine's<sup>1</sup> statement about the peritonemum, though he was undoubtedly correct in discarding the old and especially the French observations of echinococci evacuated from the female sexual organs. "Nous ne connaissons point d'exemple de kyste hydatide ouverte spontanément dans la cavité du péritoine ou du vagin, ni dans celle de l'utérus."

The only other case that we have been able to find recorded in medical literature is that given by Graily Hewitt.<sup>2</sup> The woman was married, but not living with her husband; she had been in the habit of eating much pork and veal. For eight or nine years the left side of the abdomen had been swollen and occasionally painful, but had not increased greatly in size. On March 22, 1870, grape-like masses came away from the vagina. No hemorrhage. The uterus was enlarged posteriorly, and was about the size of a gravid uterus at the second or third month. The cavity was large enough to contain an orange; its surface presented irregularities. The vesicles that were expelled were distinctly separable from each other. They contained an albuminous fluid rich in sodic chloride. The microscope showed the lamellar structure of the membranes and the echinococci-heads studded with hooklets. She was discharged well.

This is the first perfectly authentic case on record in which true hydatids have been found in the uterus. Our first case belongs to the same category.

CASE I.—*Echinococci in the posterior wall of the uterus. Incision with evacuation of hydatid vesicles. New colonies in the pelvic cellular tissue. Spontaneous perforation into the bladder and rectum.* (Figs. 1 and 2.)

Mrs. S., 57 years of age, presented herself on August 22d, 1870, and gave the following history: Menstruation began in twentieth year, had always been scanty; she was married when twenty-five, and had remained sterile. Menses ceased several months ago. Hardness in lower part of abdomen. Has suffered much for past six years from difficulty of micturition and defecation, as well as a sense of weight in the abdomen. For several weeks the retention of urine and feces has been

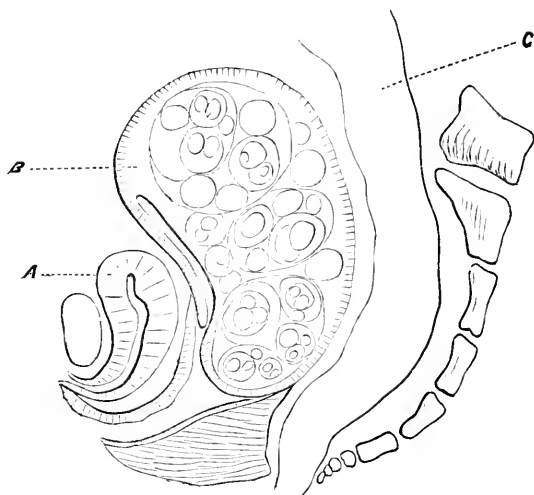
<sup>1</sup> *Traité des Entozaires et des maladies vermineuses de l'homme et des animaux domestiques*, Paris, 1860, p. 756.

<sup>2</sup> *Obstetrical Transactions*, Vol. XII., 237.

nearly complete. Only produces dejections by means of large enemata passed very high up through a long tube.

Examination gave the following results: The bladder was distended so as to rise three inches above the pubes, and was displaced somewhat to the right. To the left of the bladder in the inguinal region was a smooth elastic tumor. The vagina was reduced to two-thirds of its normal length by an elastic

Fig. 1.



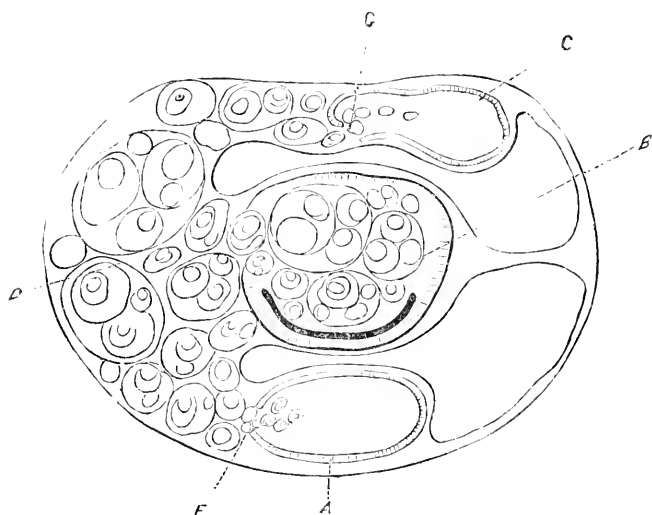
- A. Bladder.
- B. Uterus. Echin. in post. wall.
- C. Rectum.

tumor that completely filled the small pelvis. Upon passing the catheter to evacuate the bladder, we found that the urethra was greatly elongated, as happens with retroflexion of the pregnant uterus. A great quantity of thick urine was drawn off. The tumor was clearly recognized as belonging to the posterior wall of the womb, for it could be traced into the posterior lip of the os, which was completely drawn out. The external os appeared as a narrow transverse cleft, bounded posteriorly by the tumor and anteriorly by the very attenuated anterior lip. By the bimanual examination the uterus was found to correspond in size with the pregnant organ at the third month. The sound entered five inches, and showed that the anterior wall was extremely thin throughout its whole

extent. Sims' speculum brought only the surface of the tumor into view, the os being pressed forward against the symphysis pubis. Upon these data we diagnosticated a cystic tumor in the posterior wall of the uterus, and thought it a fibro-mioma with a secondary cyst.

On August 25th, in order to relieve the retention of urine and feces, as well as to aid our diagnosis, we introduced a

Fig. 2.



- A. Bladder.
- B. Uterus, Echin. in post wall.
- C. Rectum.
- D. Echin. colonies in cellular tissue, perforating the bladder at F, and the rectum at G.

trocár into the tumor very near to the os. As a clear watery fluid gushed from the canula, we at once enlarged the opening with a bistoury; a great amount of fluid escaped, containing numerous vesicles varying in size from a pea to a cherry. The posterior wall did not collapse as much as might have been anticipated from the amount of fluid evacuated; it felt thick and rough. We would emphasize this point as suggesting a likelihood of the parent vesicle being located in the uterine wall. The fluid was limpid, contained no sediment, and only traces of albumen. A more exact chemical examination was superfluous, because the microscope told the tale. With

it structureless stratified membranes, scolices and separate echinococci-hooks were seen.

During the week subsequent to the operation a thick greenish fluid, containing shreds and flakes of membrane, escaped from the incision. From this date until Nov. 11th we lost sight of our patient. She then related that immediately after reaching home she had been taken with high fever and symptoms of gastro-enteritis, accompanied by a profuse discharge of very offensive fluid from the vagina. Her general health was very good. Micturition and defecation were few. The nodular and enlarged uterus was moderately anteverted; the posterior wall still much thicker than the anterior, but in the right side of the anterior wall we were able to feel irregularities and round hard nodules. Precisely similar nodules were felt behind and to the right of the womb; the bladder was firmly adherent to this mass, whereas on the left side it was freely movable with the catheter and distensible. With the speculum the anterior lip was seen to have become much thicker than before, and presented many degenerated follicles. The posterior lip was rough and of a gray color.

In April, 1871, the woman again appeared with new complaints. She had a constant desire to urinate, and when successful had much strangury. She exhibited many vesicles which had passed with her urine. A large catheter brought away a little thick urine filled with vesicles and shreds of membrane. The woman reported that similar membranes, together with pus, had often been discharged from the vagina, after severe tenesmus. A firm infiltration of the cellular tissue to the right and behind the womb was made out; in this the cervix was embedded. The discharge through the bladder ceased about the middle of May.

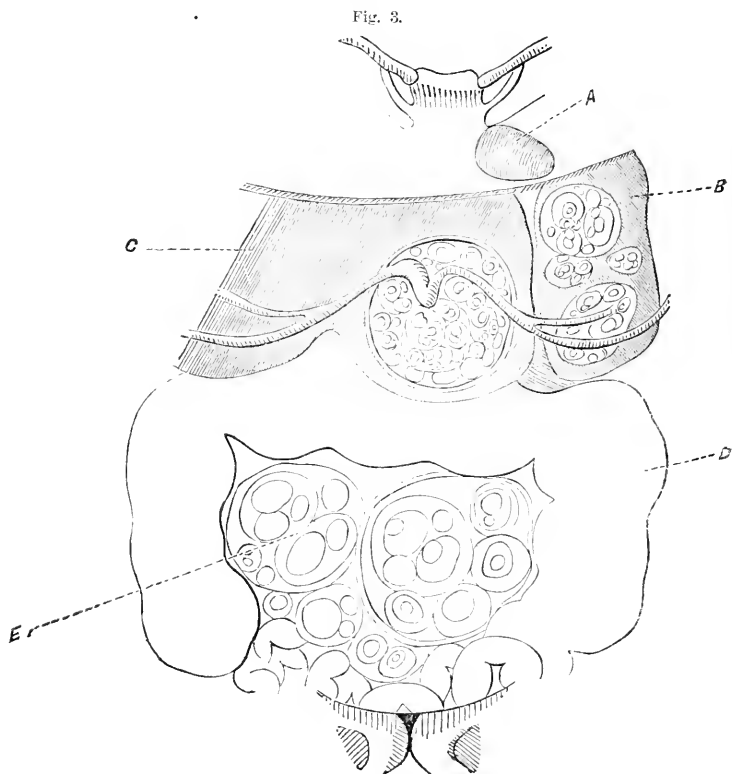
In October, 1872, the woman brought vesicles which she had passed from the rectum. She had had several profuse hemorrhages from the vagina. The uterus was more firmly held than before by the parametric infiltration, which then half enveloped the rectum with an unyielding arch, yet the mucous membrane of the rectum was only attached to the underlying tissues at one point; no perforation could be discovered. Through the speculum the vaginal portion was seen to be very broad; the anterior lip differed completely from the posterior;

it surrounded the latter like a half-moon, and was only one-third as thick. Its appearance was peculiar. The surface was smooth, the mucous membrane seemingly intact; its external border was of carmine-red color, the rest of brick-red with brighter radiating stripes; in the spaces between these latter yellow points, varying in size from a millet-seed to a pea, were scattered. The posterior lip looked like a complete vaginal portion; it was grayish, rough, and irregular. The yellow points in the anterior lip proved not to be vesicles but only ovula Nabothi.

*Remarks.*—The chief interest of this case rests upon the unquestionable presence of echinococci in the parenchyma of the uterus. That this site of the vesicles was primary is more than we can assert, for, at the same time that we found them in the womb, we likewise discovered indications of them in the surrounding tissues. They may have been first developed in the uterine walls, or have penetrated into them from the cellular tissue or even from the peritoneal cavity. In the latter alternative, the case would be analogous to those in which the same entozoon has been known to pass from the pericardium into the substance of the heart; according to the best pathologists it is never developed primarily in the last-named organ. Our case is at any rate a new proof that echinococci may exist in the parenchyma of the uterus.

CASE II.—*Echinococci in the liver, spleen, great omentum and pelvic cellular tissue.* (Figs. 3 and 4)—Miss J., 22 years old, began to menstruate when 15, and has always been regular. Has been in poor health for three years. The abdomen has been gradually swelling in its upper and middle parts. Lately catamenia more scanty, and frequent desire to urinate. Is much emaciated; left thorax is somewhat distended; the heart is pushed upward and to the right; the apex is in the second intercostal space. Beneath the heart is the spleen, greatly enlarged and extending downwards to the edge of the ribs. The liver extends from the fourth rib to two inches below the thorax. The womb is pushed down towards the pubes. By percussion a portion of the stomach can be made out, projecting from beneath the spleen. The ascending, transverse and descending colon can be distinctly traced around a tumor, whose

surface is broken up by smooth prominences. The tumor reaches to the symphysis pubis and gives the most perfect hydatid tremor upon percussion. The vagina is very much



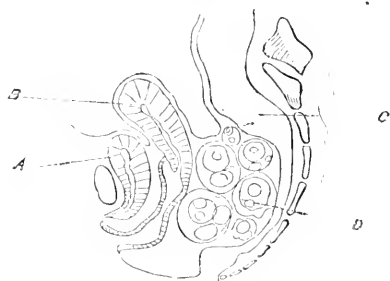
A. Heart.  
B. Spleen.  
C. Liver, Echinococci in left lobe.  
D. Colon.  
E. Omentum, Echinococci.

compressed, and the uterus is held firmly against the pubes by an elastic tumor, which projects from the right side of the small pelvis toward the middle. The rectum is pushed over to the right and is somewhat constricted, yet defecation has not been impeded. Puncture of the tumor per vaginam revealed all the characteristics of echinococci; after its evacuation small round tumors were still to be felt behind the womb. The cyst evacuated, and those still remaining in the pelvis are



unmistakably situated in the extra-peritoneal cellular tissue of the pelvis; we may likewise assume that the hydatids composing the abdominal tumor are in the omentum and equally

Fig. 1.



- A. Bladder.
- B. Uterus.
- C. Rectum.
- D. Echinococci, subperitoneal.

extra-peritoneal. In these particulars the case resembles one reported by Lendat,<sup>1</sup> where the diagnosis was corroborated by the autopsy.

CASE III.—*Echinococci of liver, spleen, great omentum and probably of the right ovary.*—May, 1868. Mrs. K., 25 years old, first menstruated when 15, the mother of one child. For six months the abdomen has been enlarging upon the right side. Menstruation is regular. For past six weeks the growth of the tumor has been rapid and attended by severe abdominal pains, fever, great thirst, and prostration. The heart is displaced as in the previous case, but the spleen is even larger and projects two inches below the edge of the ribs. The liver extends from the third rib to three inches below the margin of the ribs; the left lobe is chiefly enlarged, and forms a very prominent tumor, which gives the hydatid tremor; the ensiform cartilage is forced outwards. The colon here also encompasses a mass of hydatids in the omentum, which impart the characteristic tremor. This tumor is separated from the symphysis pubis by convolutions of the intestines. The uterus is easily grasped bimanually, and is anteverted. Obliquely behind it is a small cystic tumor resembling in every respect an ovarian tumor. For the purpose of relieving the dyspnœa, the

<sup>1</sup> Gazette Médicale de Paris, No. 27, 1856.

cyst in the left lobe of the liver was punctured with a trocar three times at intervals of three weeks. It discharged the usual contents of an hydatid cyst; the last time the fluid was purulent and the cavity did not now refill. The tumor of the omentum was treated in the same way, but was not completely emptied. The woman then felt so comfortable that she refused to allow any further interference.

CASE IV.—*Echinococci, of hepatic origin, in Douglass' Pouch*.—Mrs. R., 55 years old, presented herself because of a tumor in the right side of her abdomen. She could give no information as to the manner of its growth. The abdominal organs all seemed healthy until we reached the genitals. The senile uterus was pushed forwards and to the left side by a tumor as large as a child's head at birth; it was rough, hard, and not fluctuating, and seemed to be adherent to the posterior wall of the womb, and not to be connected with any other abdominal organ. The woman's sufferings arose from repeated attacks of circumscribed peritonitis in the vicinity of the tumor; these were relieved, and she passed from our care. By a lucky chance, however, we were present at the autopsy of this patient, who had died of some intercurrent affection. We found a firm tumor in the spot designated: it was adherent to the uterus, and at first appeared to have no connection with the other organs; but a careful search was rewarded by the discovery of a band, a foot long, and as fine as a thread, running to the right lobe of the liver. The tumor consisted of a dead echinococcus cyst filled with an immense number of secondary vesicles. The connecting-band and the deep yellow color of the membranes point, with a strong show of probability, at the liver as the original site of the cyst. It had developed in the substance of the liver, gradually protruded from its surface, became pediculated, and hanging down into the pelvis, formed adhesions there. The case was suited to deceive the most skilled diagnostician.

According to Virchow, echinococci develop in the lymphatic vessels. Every cavity containing a parent cyst has two walls, one belonging to the organ and one to the animal. The membranes of the cyst, when discharged, always roll up inside out, exciting a doubt among the ignorant as to whether the animals do not grow on the outside. If there is any roughness

on one side of the membrane, it is safe to conclude that this is the inner surface. The irregularities are not, as a rule, young animals, but only pathological appearances common to old age. On section, the membrane is seen to consist of many strata, arranged with the greatest possible regularity. Each principal layer is divided into many thinner ones. Much the same, though less regular an appearance, is seen in a common fibrinous coagulum which has been formed by successive deposits. Acetic acid, however, caused the layers of fibrine to swell and the stratification to disappear. No such effect is produced upon the echinococcus membrane.

A sediment is commonly found at the bottom of the cyst, consisting principally of egg-shaped formations of carbonate of lime, as deposited in the body of the animal. They only appear in old animals, and their number increases with age. These are of great value in the diagnosis, but are not absolute.

The hooklets are like young hyoid bones in shape, and are the surest indications of the entozoon when it is no longer present. One hook and a few lime formations are sufficient for a diagnosis. The cysticercus has similar but much larger hooks, and likewise lime deposits.

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#### CASE OF RETAINED OVUM AFTER DEATH OF THE FETUS.— EXPULSION IN THE TENTH MONTH OF GESTATION.

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Reported by MACKENZIE JOHNSTON, M.D., Galveston, Texas.

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Mrs. —, confined with her last child January 2, 1872; menstrual flow returned first time subsequent to this confinement on 20th May, 1873; continued two days and ceased, her menses usually continuing five days. Symptoms of pregnancy manifested themselves very soon thereafter, and she consulted me, on 23d July, as to the propriety of weaning her child. She said she was confident that she was again pregnant, as she had passed two periods without any menstrual molimen, her general health being excellent. Advised weaning.

She consulted me again on October 18th, five months and

nine days from cessation of menses, and informed me that she had ceased to enlarge, and had never felt any active motion of the child, and that in her other pregnancies (this was her seventh) she had always quickened about the 4th to 4½ month. Nothing had occurred to interrupt the gestation of sufficient importance to attract her attention. At the date of this visit she was suffering from a slight catarrhal fever. I saw her frequently from this time to last of February, her general health being excellent all the while. The period of gestation, calculating from 21st May, the day the menses ceased to flow, should have terminated on February 25th, 1874.

On the 10th March she informed me that she had a slight discharge per vaginam, of a watery fluid, slightly tinged with blood, entirely odorless, and unaccompanied by pain. Advised her to remain at home, keep quiet, and to summon me in case of occurrence of pains or flow of blood. Was called in haste on 17th March, 11 o'clock p.m. Found pains slight and short, but recurring at intervals of three to five minutes. The uterus, as felt through the abdominal walls, appeared of about the size of a cocoa-nut, and grew sensibly firmer during the pains. Upon examination per vaginam, the cervix was felt elongated, its walls thick, and the os uteri sufficiently dilated to admit the index-finger. On depressing the body of the uterus, with one hand firmly pressed upon the hypogastrium, and the index-finger of the other carried into the cervical canal, the cavity of the body could be penetrated by the extremity of the finger, but the presenting part of its contents could not be reached. The parts were well lubricated with a colorless mucous discharge. After waiting a short while, the pains not increasing, and the patient being annoyed by their frequent recurrence and trifling character, and not deeming it necessary to interfere to hasten the uterine action, I prescribed the following draught: R. Potas. bromid., ℥i.; chloral hydrat., gr. xv.; aquæ, ℥ij. M. ft. haust. S. Take at once; and retired to rest, requesting to be called as soon as the pains appeared to increase in violence. The patient went to sleep soon after taking the draught, and slept quietly and uninterruptedly till 3½ o'clock a.m., when she waked with pains much increased in force. Was called at 5 o'clock a.m., and found the pains very much increased in length and force. Upon removing napkin found there had been a loss

of about an ounce of blood. Upon examination per vaginam, discovered a sac of fluid protruded into the vagina from the os uteri, the cervix much shorter, and the os dilated to the size of a half-dollar; a firm substance, without definite outline, could be felt above the os, from which the sac depended. The pains were efficient, and the labor made satisfactory progress. Loss of blood very slight. At 5½ o'clock A.M. the sac of fluid was protruded beyond the vulva, and contained a small firm body suspended in it; a firm fleshy substance was engaged in the os, which, after a couple of pretty severe pains, aided by slight to-and-fro tractions made upon it by the thumb and index-finger, was expelled into the vagina, and the whole mass removed. Upon examination, the mass proved to be an ovum entire, and upon dividing the membranes, which possessed considerable tenacity, about four ounces of a dark brownish-colored fluid escaped. In this sac was contained a fœtus of about 3½ months' development, of an ash or light drab color. Its tissues were shrivelled and firm, as if it had been preserved for some time in alcohol; the umbilical cord was attached at both extremities: it was very much shrunk, and possessed considerable strength; the vessels were empty, flaccid, and not twisted upon each other. The fœtus was much flattened, particularly the head. The placental mass was about four inches in length, two and a half wide, and about two inches thick; its substance firm, and in portions semi-fibrous; its uterine surface presented evidence of its recent detachment. Its foetal surface contained a number of cysts, filled with a clear amniotic fluid, varying in size from that of a pea to a walnut. There was not the slightest fetor about the ovum, its smell being like that of fresh amniotic liquor. The patient made a speedy recovery without an untoward symptom.

The interest this case possesses, not only as a rare phenomenon in physiological gestation, but in a medico-legal point of view, has prompted me to examine into the history of recorded cases of a similar kind, and I herewith give the result as obtained from the limited resources of my own private library.

RAMSBOTHAM (System of Midwifery) says: "The vitality of the ovum may have been destroyed some hours, days, or even weeks previously to its expulsion. The ovum may be expelled from the uterine cavity at any period subsequently to its death.

It is sometimes retained many weeks after it has lost its life; but it is a very unusual, and certainly abnormal occurrence, for an ovum to continue in utero beyond nine months from conception. I have often known one that had perished early in gestation lie in utero without producing any serious symptoms, until the natural term of healthy gestation was completed, but very seldom, indeed, have I had reason to believe that the ordinary period of pregnancy had been passed." "It sometimes happens that, after the birth of a living child at full term, a smaller ovum or dead embryo, flattened or otherwise disfigured, is thrown off of an age evidently much less than the mature infant. The phenomenon is easily explained upon the supposition that the patient originally conceived of twins; that one lost its life early in gestation, and that the process of gestation was carried on for the benefit of the live foetus, till they were both expelled together, or nearly at the same time, at the full period of pregnancy. The only difficulty attached to this solution is, that these secondary foetuses, although invariably dead, are often perfectly fresh, bearing about them no marks of putrefaction; but this may be explained by their never having been in contact with the external air."

CHURCHILL (*System of Midwifery*) says: "As a rule it may be stated that the death of the foetus will be followed by its expulsion, but the period of this occurrence varies very much; a few days only may elapse, or it may be months, or, in a few rare cases, years."

ASHWELL (*Diseases of Women*): "All pathologists allow the existence of moles which owe their existence to conception, however differently they may explain the circumstance of their formation, where the embryo having died early, the ovum being retained, has increased in size and solidity, not by a process of growth as in natural pregnancy, nor even as in a tumor or polypus, but from the effusion of coagulable lymph from inflammation of the living membrane. This forms successive layers over the surface of the dead ovum, giving it eventually a great degree of consolidation. Some years ago I was present at the expulsion, after much previous flooding, of a firm fleshy mass, equalling in size a large orange. The small central cavity was lined by a smooth and perfectly formed amnion, with a little fluid. I could detect no appearance either of an embryo

or umbilical cord. Physiologists have supposed that in these cases the tender germ may have been deprived of life, and subsequently dissolved in the liquor amnii."

M. CAZEAUX (Midwifery): "After the death of the fœtus the ovum is a foreign body in the uterine cavity, and its expulsion is generally effected in about eight or nine days. However, this term is not uniform, it being not at all uncommon for the dead fœtus to remain much longer in the womb, two or three weeks, or a month, for example. I saw a woman at La Clinique, in whom the child's death was clearly ascertained, though she did not abort until six weeks afterwards. Cases are also recorded of the embryo remaining in the womb until the ninth month. When a long time ensues between the death of the child and its expulsion, there is, in general, less danger from hemorrhage than if the premature labor had taken place immediately. In these abortions, less blood is usually lost than after the most favorable gestation; which is probably owing to the fact, that the child's death diminishes the activity of the uterine circulation, especially that of the utero-placental vessels, which must become obliterated in a great measure, and consequently can furnish but little blood at the time when the placenta is separated. By examining the dead fœtus, we may learn why its prolonged sojourn in the uterine cavity has been wholly innoxious to the mother. In fact, the infant is not putrefied, as is proved by its having no bad odor; the solid parts undergo a peculiar transformation. It withers away, becomes shrivelled and dried up, and looks like a little mummy, of a yellow color, or like a fœtus preserved for a long time in alcohol."

M. CHAILLY (Midwifery) says: "However, the death of the fœtus does not always involve the cessation of pregnancy. One of my patients, to whom I called M. P. Dubois, presented a very remarkable case of this kind. This lady, already the mother of two children, became pregnant a third time, and reached the third week of her pregnancy without inconvenience; but at this period she experienced a feeling of lassitude, accompanied by pain in the loins; she complained of pricking sensations in the breasts. This condition of malaise continued for months without any appearance of the menses. The patient, who for the rest had experienced from the commencement all

the feelings of her first two pregnancies, and having no doubt that she was again pregnant, although her abdomen did not become developed, requested my advice. She was at this time five months and a half pregnant. I noticed the development of the uterus, but it was far from being in correspondence with the presumed term of gestation. The active motions of the fœtus were not perceived, and auscultation afforded no sign. At six months and a half I was again summoned to this patient, and delivered her, after a regular labor, accompanied with tolerable hemorrhage, of an ovum four inches in length, which contained an embryo of at most not more than four lines. It was reddish, and floated in a liquid of a brick-red color. As is evident, the fœtus in this case ceased to live at fifteen days or three weeks, while the placenta continued to grow in the uterus."

DR. C. D. MEIGS (*Females and their Diseases*) has the following: "Although the death of the embryo involves a certain cessation of the projection of its blood to the vessels of the placenta, and notwithstanding this cessation generally is very speedily followed by the expulsive action of the womb, it is not always soon followed by the latter effect. A lady conceived about the 20th of April, 1842, and consequently made arrangements for her accouchement for the 20th of January, 1843. The pregnancy went on well until about the 5th or 10th of August, when she had a very slight show, and there was complete arrest of the usual developments. She was at various times affected with slight appearances of her catamenia, as she supposed, but without any flooding until the 3d of January, 1843, when she sent for me, saying she had suffered extreme pain, like the pains of labor, for some hours, but was now easy, though she thought something was escaping from the vagina. On examining the patient, I detected the ovum partly in the vagina and partly embraced within the cervix, which I removed with the index-finger, and upon carefully examining it found that it was the unbroken ovum of a fœtus of three and a half months, apparently. The ovum itself contained a sort of granular brown and thick fluid, while the fœtus, also of a mummy color, retained its lineaments, although considerably macerated by its long residence in the waters. The placental portion of the ovum was red and fresh-looking, and had evidently retained



more or less vitality up to the period of its separation from the womb."

IN RANKING'S HALF-YEARLY ABSTRACT, No. xiv., p. 266, is the abstract of a case of anomalous pregnancy, reported by Dr. Thomas Churchill, in which gestation proceeded to the full term. When the contents of the womb were expelled there was no fœtus, nor even cord attached to the placenta, which was of full size and perfectly formed. The fetal surface of placenta was level, and in place of a funis the vessels terminated in a round knot. This patient became pregnant in June. In September she was attacked with slight hemorrhage, which she attributed to a fright, which recurred again in December and January. In this case the young fœtus probably escaped unobserved in one of these hemorrhages.

In No. 22, p. 159, of same journal, is the abstract of an article by Dr. Johns on the effect of the death of the fœtus upon the duration of pregnancy. Dr. Johns relates the case of a fœtus which died about the sixth month, and was retained to the natural term of pregnancy. The ovum was expelled entire, and contained about a pint of whitish fluid of the consistence of skimmed milk, in which was floating a dead, dried-up and withered fœtus, apparently of about six months, presenting very much the aspect of having been for some time macerated in spirits of wine. The placenta and membranes were healthy, and neither they, the child, nor the liquor amnii exhaled the least unpleasant odor. There was not any hemorrhage or other bad symptoms after delivery, and she recovered very quickly. The patient said she had enjoyed much better health than usual whilst carrying this child, and that she had gained flesh.

In the AMERICAN JOURNAL OF OBSTETRICS, vol. iv., p. 550, Nov. 1871, in the report of Transactions of the New York Obstetrical Society, "Dr. Jacobi exhibited a specimen which was interesting, as showing the length of time an ovum may be retained in utero after the death of the fœtus. Its expulsion occurred in the eighth month. The ovum was entire and much shrunken in appearance. The placenta was well formed, but in a state of fatty degeneration. It was evident from the appearance of the surface of the placenta, that its attachment to the uterine wall had but recently been disrupted. The fœtus was apparently but ten or eleven weeks old. The ovum

was retained about five and a half months after the death of the fœtus. No hemorrhage followed the expulsion of the mass. Dr. Jacobi said the longest time he had ever seen an ovum of this size retained after death of the fœtus was seven months. Dr. Noeggerath remarked that it not infrequently occurs that the entire ovum may be retained a number of months after death of the fœtus, though more frequently a part of the after-birth or decidua is retained. Dr. Peaslee said that he presented a case two years ago to the Pathological Society where seven months elapsed before the expulsion of the ovum. The patient flooded at the third month, after which there was no increase in the size of the uterus; the husband of the patient was away during the four months previous to the expulsion of the ovum."

The same journal for May, 1873, vol. vi., No. 1, p. 108, in reporting the transactions of the Philadelphia Obstetrical Society, has the following: "Dr. C. A. McCall exhibited a blighted ovum, apparently in the third month, and stated that on the evening of the 14th of Jan. 1873, he was called to see Mrs. R., and found her in labor, in which condition she had been for sixteen hours. The child was presenting by the feet. With some difficulty a medium-sized female child was delivered; it was asphyxiated, but after working with it for half an hour it breathed. On removing the placenta and membranes, the accompanying specimen came with it. It is apparently another fœtus, about three months old, and flattened by pressure. The mother had been in excellent health during the pregnancy, and was unconscious of anything unusual having occurred during that time to which the death of this embryo can be attributed."

In illustration of the importance and interest of this case in a medico-legal point of view, the following case, as given by Dr. Johns, is *appropos*: "Captain B., Royal Navy, marries, and leaves his youthful bride to join his ship three weeks after his marriage, she then being pregnant, but without his or her own knowledge. Gestation progresses favorably for three, four or six months, at the end of which period the child ceases to live, but is retained in the womb till the full period of natural pregnancy. The womb not having enlarged after the child's death, the mother never felt her child, nor was she at all conscious of

her condition, being necessarily inexperienced in such matters, besides being, as she supposed, unwell each month (which discharges may have depended upon ulceration of the os uteri, or upon nature's attempts to throw off the dead fœtus, or upon many other causes, too numerous here to relate). However, at the end of the ninth month, her husband returns, expecting to find a young and spotless wife, to be alike participator of his joys and griefs, when, alas! to his horror and dismay, he finds that she has just given birth to a three or six month child, but dead. Is it not natural that he at once accuses his lady of infidelity? And what protestations of hers as to her innocence, be they ever so solemn, shall convince him that she still is not guilty? This is the juncture at which the physician may be the balm or the wormwood; therefore upon him rests the responsibility of deciding the question. But if he be ignorant of the possibility of a dead child being carried in utero for such a length of time, he condemns the lady, and it is needless to say the consequence is too apparent. If, however, subsequently, the ill-judged, ill-treated and unfortunate lady's innocence be proved, what shall become of the reputation of that physician who unhesitatingly pronounced her guilty? But if no such happy result should ensue to the lady, what shall and ought to be the feelings of that man, when, in after years, he shall discover his ignorance, and think upon the mischief it had entailed upon society?"

In reflecting upon this case there are several questions of interest that suggest themselves. What determines the protracted retention of the deceased ovum in such cases, whereas its early expulsion after death is the rule? Why is it that the mother's health is not affected? And why is the ovum not macerated and dissolved in the fluids under these circumstances?

The death of the ovum may depend upon conditions affecting the uterus, the placenta, the umbilical cord or the fœtus, and these conditions, and their mode of action, in all probability, determine the early expulsion or long retention of the contents of the uterus. These pathological conditions of the womb itself, or of other organs of the body acting upon it, traumatic causes, etc., sufficient to cause the death of the fœtus if they excite uterine action or predispose to it, will in all probability be followed by an early expulsion, particularly if a partial separation

of the placenta should occur determining hemorrhage, for a small clot retained about the cervix may excite uterine contractions, and result in a speedy expulsion.

If the placenta is gradually separated by exudation between its uterine surface and the walls of the uterus, or from other causes, a normal adhesion never repairs the breach, although a firm adhesion may and often does take place, sufficient to preserve the vitality and even nutrition and growth of the detached portion, and in some instances so firm as to be with great difficulty broken up; yet the *glandular* function of the placenta and its function of hæmatosis is lost, and is never recovered in that portion that has been separated. The foetus suffers in proportion to the extent of the separation, and will, if it be extensive, eventually perish and be expelled at a more or less remote period thereafter.

If the conditions affect the foetus itself, or the umbilical cord, and in such a manner as not to involve the uterus, the foetus after losing its vitality may remain in the uterus for an indefinite time, the placenta all the while continuing to grow, but of course more slowly as the supply of blood is diminished; for after the death of the foetus it is not called upon to transmit through its vessels the blood that would have been required for the nutrition and growth of the child.

M. MOREAU says: "As soon as the infant diès in the womb, the cessation of the foetal circulation occasions changes in that of the organ; the blood being arrested in the vessels coagulates there; the latter retract, or even become obliterated, and no more blood reaches the womb than what is necessary to its nutrition, since the stimulus that heretofore determined a greater quantity to it no longer exists."

In this last class of causes we may look to find instances of protracted retention and late expulsion; and the changes that have taken place in the utero-placental circulation readily account for the slight hemorrhages that usually accompany them.

The fact that the membranes being intact and the os uteri closed, thereby excluding the atmospheric air, is sufficient to explain the absence of putrefaction and its results upon the health of the woman. Scanzoni says: "The considerable amount of salts which the liquor amnii contains in solution is

an important element in preventing decomposition. In abortions occurring during the first few weeks of gestation no trace of the embryo, or only fragmentary portions, can be found in aborted ova when the membranes are unruptured, while the thickened and cloudy appearance of the liquor amnii in these cases makes it more than probable that the product of conception has been more or less completely dissolved in the fluid which surrounded it. In the third, fourth or fifth month the fœtus looks as though it had been preserved for a long time in a feeble saline solution, viz., it is somewhat shrunken, the skin is in folds, the muscles are thick and harder, the entire fœtus is in that condition which is designated by the name of '*Mummification.*'"

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#### THE LOCAL APPLICATION OF NITRIC ACID IN ENDOCERVICITIS AND ENDOMETRITIS.

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By H. E. WOODBURY, M.D., Washington, D. C.

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IN 1868 I began my investigations relative to those troublesome and persistent diseases, endocervicitis and endometritis, the cervical and corporeal endometritis of recent writers. Reflecting upon this subject, I became convinced that these diseases could be more successfully treated, and more speedily cured, than had hitherto been the case, and therefore determined, if possible, to devise some more efficient mode of treatment.

Concluding that the oftentimes prolonged treatment of and frequent failure to cure these diseases resulted from the fact that the agents used did not penetrate deeply enough into the tissues, I determined to try some new remedy. My experience with nitric acid in other diseases led me to the conclusion that it would prove a better and a more active agent for the treatment of endometritis, cervical or corporeal.

In order to ascertain the probable comparative results of applications like the nitrate of silver and pure nitric acid, I made two incisions with a penknife into a piece of fresh raw beef. Into one of these I introduced for a few seconds a pencil of

the nitrate, into the other a little fuming nitric acid. Now, although we have to consider that all experiments made upon dead tissue may be attended with different results from what they would be if made upon the living, I still believe that this one gave me much information. It certainly convinced me that the results of these applications appeared very dissimilar. Shortly after the application of the acid, the tissues to which it had been applied presented a glistening, pearly or grayish white appearance, and were quite as, if not more moist than before the application, while those acted on by the nitrate were of an iron-rust color, dry and crusty, as if seared with a hot iron. From these appearances I reasoned as follows. If the results of these applications present such different features on the dead tissues, may not their effects be quite as different when applied to the living? And when applied to the mucous membranes, may not the one exercise a more salutary effect upon them than will the other? I believed so, and determined to give the nitric acid a trial, but a difficulty presented itself. How could I apply it properly, carefully and thoroughly? I went to work to solve this problem, to devise an instrument by means of which I might convey the acid to the cavity of the cervix, or of the body of the organ if necessary—one that would not be injured by the corrosive properties of the acid. After repeated trials I made the Uterine Injector, shown in Figure 1.



Uterine Injector.

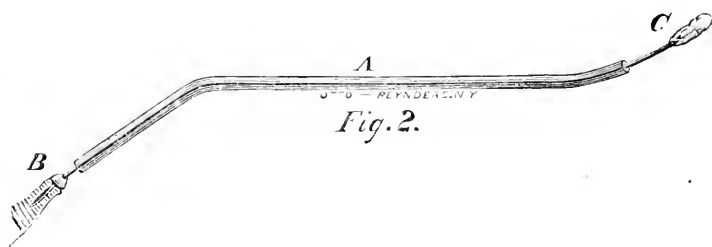
The instrument is simple in construction and safe in practice, if used with care and judgment. It consists of a piece of glass tube (A), calibre of catheter No. 8 or 10, bent as in the diagram. At the extremity (C) there is a capillary opening, the end of the tube being perfectly rounded by heating it in the flame of a spirit lamp. The tube is six or seven inches in

length. Attached to the other end (B), is an india-rubber nipple or bulb, air-tight. The curve near the smaller end (C), corresponds to that of a female catheter, and the angular bend near the other end is to prevent the hand of the operator from obstructing the view when the instrument is used.

By compressing the rubber bulb (B) we exhaust the air, on the principle of the syringe, and on releasing this take into the tube from a bottle a few drops of the acid or other fluid that we wish to use. The instrument, thus charged, is introduced through a speculum into the cavity of the neck or body of the organ, as the case may require, and the contents slowly discharged by compressing the nipple or bulb.

In order to make intrauterine applications in a safe and efficient manner, the entire cervical canal must be patulous enough to admit of the passage of the instrument without difficulty, and to allow any superfluous fluid to escape. The application should be made slowly, and only a few drops of the fluid should be used. I have used ten drops, but now never exceed five, and seldom more than three.

Although the injection, in my hands, proved all that I could desire, I determined if possible to construct an instrument to which the objections urged against intrauterine injections would not apply. The following diagram represents the result of my efforts.



The Uterine Applicator.<sup>1</sup>

This instrument very much resembles the injector in shape, so far as the glass tube (A) is concerned, the only difference consisting in this, that in the applicators the opening at both

<sup>1</sup> These instruments may be procured from Messrs. Otto & Reynders, 64 Chatham Street, New York.

terminal extremities are of the same diameter, while in the injector one of these is capillary. The edges of these openings should be well rounded by heat. Through this tube (as a canula) is passed a flat steel staff having a handle (B) attached. The staff is about two inches longer than the tube. The temper is removed from the last inch or two of this, in order to permit of its being bent to any desired curve.

The instrument is used as follows: We first moisten the end of the staff (C), and wrap closely around it just enough of cotton to admit of its being drawn back into the tube without difficulty. This cotton mop is then saturated with the fluid we desire to use, and withdrawn into the tube. The end of the tube is well wiped, and through the speculum introduced into the womb—slight dilatation of the os internum being sometimes necessary, in order that the tube may be passed. Having the tube introduced, we, by pushing in the staff gently, mop the cavity of the neck or body, as the case may require. It will be readily seen that we have the fluid we use entirely under our control, and can bring it in contact with the surface just *when* and *where* we please.

If deemed desirable, a few drops of the acid, iodine or any other fluid, may be drawn into the tube, if we wrap enough cotton on the end of the staff to make it act as a piston. This will flow out slowly—guttatim—when the staff is pushed in, and not with the force of an injection.

I no longer use the nitrate of silver in these cases, and my reasons are as follows. It does not enter deeply enough into the tissues, forming, as it does, a film or slough, by coagulating the albuminous compounds on the surface. It causes pain when applied, and for some hours after, as a rule. It ruins the linen when it comes in contact with it. It is slow in its action, and often fails to effect a cure.

I claim for the nitric acid that it acts efficiently, is easily controlled, does not cause pain, but simply a sensation of warmth in the part, does not cause a perceptible slough, and never harms the garments, as it never comes in contact with them.

Dr. L. Atthill<sup>1</sup> has invented an intranterine speculum for the purpose of making applications of nitric acid to the interior of the womb. I believe that in the large majority of cases the

<sup>1</sup> Braithwaite, No. 67, for July, 1873, p. 178.



applicator devised by me will prove a far more convenient and useful instrument for this purpose.

While I consider nitric acid the most valuable application for these cases I also use other agents locally—as tincture of iodine and carbolic acid. My method of treatment is as follows: I first apply with the injector or applicator from two to five drops of pure nitric acid, having previously removed the secretions so far as possible. On the third day I use the carbolic acid, or the tincture of iodine. On the fifth the nitric acid again. On the seventh one of the other remedies. Thus it will be seen that, while I make my applications on alternate days during the first week or ten days of the treatment, I do not make two consecutive applications of the nitric acid, and in any ordinary case the entire number of the acid applications would not exceed four or five. The application in each case is followed by the introduction into the vagina (through the speculum) of a cotton plug to which a fine strong cord is attached. This plug is saturated with carbolic acid and olive oil (parts 1 to 6), or with the fluid extract of hemlock (Kennedy's), and is permitted to remain twenty-four hours, when it is withdrawn by the patient herself, and the parts cleansed by an injection of the solution of sulphate of zinc, or castile soap and water.

As soon as the organ begins to assume a more healthy condition, as evidenced by a diminution of the secretion, the applications are made at longer intervals. If the case be characterized by anæmia, I order chalybeates—but the uterine tonic from which I have seen the best results is the fluid extract helonæ (Tilden's), given in twenty-drop doses, *ter in die*. I prescribe it in nearly every case.

From my notebook I take the following data of six cases, showing the number of applications made, and the results. Including these, I have treated more than fifty cases of cervical and corporeal endometritis in a like manner with equally satisfactory results as to cure and duration of treatment.

CASE I.—The first case in which I used the injector was that of a colored woman, about thirty years of age, who called to consult me in 1870. Her symptoms were characteristic, and left me without doubt as to the nature of her disease. A specular examination confirmed my diagnosis—endocervicitis. I informed her that local applications were required in her case

and that she could probably be cured in a short time if she would permit me to use an instrument I had invented for such cases. I offered to treat her gratuitously if permitted to use the injector, otherwise she must go to the ward physician. She agreed to this proposition, and I made the first application with the injector, in a manner perfectly satisfactory. In from five to six weeks she was cured.

CASE II.—A poor white woman, married, aged 28, mother of one child five years of age; full habit; weighs about 150 pounds. Six weeks before she sought my professional services she had a miscarriage. For many months previous to this she had suffered from leucorrhœa. Her disease was endometritis, complicated with subinvolution, an unpromising case. Told her of my success in case I. She desired me to use the injector; I did so. She was cured in twenty-nine days, after eleven applications. Such a result was a source of real astonishment to me, and I can only explain it upon this ground. The os and cervix were in a very patulous condition, and there was excessive hypersecretion. For this reason the acid and other remedies were used more freely, so that a small portion mixed with the secretions flowed back into the vagina, as I removed the injector.

CASE III.—Mrs. T. Treatment commenced Dec. 22, 1873, terminated Feb. 2, 1874. During this period twelve applications were made. The disease was confined to the cavity of the cervix, and the woman was in the second month of her pregnancy. As she was a married woman, I asked her, before commencing treatment, if she menstruated regularly. She said that she “was not so freely unwell the last time.” This I attributed to the profuse leucorrhœa, and went on treating her boldly. After I discharged her, cured, she very frankly informed me that she “thought herself pregnant when she came for treatment, and expected by the treatment to get rid of it.” At term she was delivered of a living child. Has had no return of the disease.

CASE IV.—Mrs. R. About 20 years of age; full habit, weight 130 lbs.; had been married eighteen months. Was healthy and regular before her marriage. Shortly after missed her menstrual period, and thought herself pregnant. Her next period was characterized by a profuse flow, which she attributed to a miscarriage. She suffered from ill-health for

many months after this. Her husband brought her to consult me. Treatment was commenced Aug. 6, 1873, and terminated Sept. 26, 1873.

Fifteen applications were made during this period. Her case was endocervicitis. She was dismissed cured. About the middle of May, 1874, Mrs. R. called to engage me for her confinement. On the 20th of August, 1874, I delivered her of a fine healthy child. The mother and child are both alive and well.

CASE V.—Mrs. T. Endocervicitis. Treatment commenced July 28, 1874; terminated Sept. 28, 1874. Eleven applications were made. Result—cured.

CASE VI.—Miss M., aged 23, tall and slender in figure, called on me about the middle of June, 1873. She complained of various aches and pains, was very irritable and depressed in spirits. Said she felt at times “like plunging into the river, and ending her troubles.” Had been feeling very badly for several months. Suffered much from leucorrhœa. Could not make up her mind to be examined. Ordered injections of sol. zinci sulph., and told her if these did not benefit her she must submit to local applications. More than a week after she came back to me, satisfied that the local treatment alone would meet her case.

Treatment commenced June 24, 1874; terminated Sept. 30, 1874. Twenty-four applications were made, and the treatment was interfered with by reason of a prolonged menstrual period (lasting twelve days), the first after treatment commenced. She was discharged cured, and informed me a few days since that she “never felt better in her life.” She acted very imprudently during treatment, in using the sewing-machine and taking long walks.

In each of these cases from three to six of the applications were of nitric acid; the others were of tinct. of iodine or carbolic acid.

Several months since I gave to my friend, Dr. N. S. Lincoln, of this city, an injector, and explained to him my method of using it. He had previously applied nitric acid with an ordinary probe. To-day (Oct. 12, 1874) he informed me that he had been using my instrument with the most satisfactory results, having cured with it some cases that he thought at first would not

prove amenable to treatment. He has been using the same instrument for more than six months, and expresses in strong terms his appreciation of its value.

The value of nitric acid in the treatment of uterine diseases, as set forth in this paper, has been fully confirmed since I first used it in Case I. Dr. Atthill<sup>1</sup> gives Dr. Miller, of Louisville, U. S., the credit of having been the first to use it. I am perfectly willing that Dr. M. should have this honor, but I claim at least the credit for having had the nerve to use it in such cases when I was not aware that it had ever been tried. Applied with care, I consider it a safer and better remedy than the nitrate of silver, caustic potash or acid nitrate of mercury, and far more easily controlled.

I do not deny that mishaps have sometimes resulted from intrauterine injections. Some of the simplest surgical operations have terminated unfavorably. If my method is opposed upon the ground that it is attended with danger, as every surgical operation may be, and many are, with equal propriety the use of the knife, the lancet or the catheter should be avoided upon all occasions. I consider that the advantages far outweigh the dangers attending the treatment herein advocated. Seanzoni<sup>2</sup> says, "We do not remember a single case where we have been able to cure an abundant leucorrhœa of several years' standing." I think that if he had used nitric acid freely his testimony would have been more favorable. I know that such cases may be cured, the elements essential to success being, *nerve, judgment* and—*nitric acid*.

In conclusion, my experience with nitric acid in these cases convinces me that it is a more heroic remedy in name than in reality, and I feel assured that its more general use by the profession will tend to develop its real value. I venture the prediction that within a few years it will become the favorite remedy for this always annoying, persistent and oftentimes incurable disease.

<sup>1</sup> See Dr. Atthill in Braithwaite, No. 67 for July, 1873, p. 177.

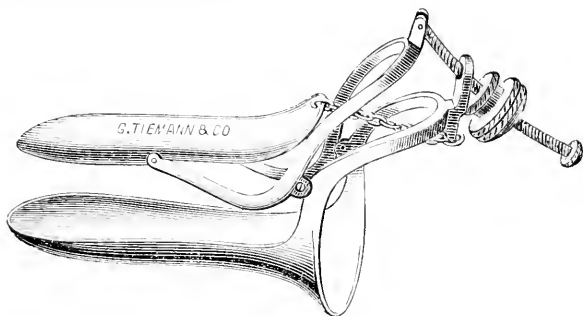
<sup>2</sup> Diseases of Females. Am. Ed., p. 202.

## NEW INSTRUMENTS.

### A NEW VAGINAL SPECULUM.

BY J. L. DICKEN, M.D., WABASH, IND.

For obvious reasons it is unnecessary to apologize for presenting to the profession another Vaginal Speculum, and claiming that while it equals those hitherto in use, in point of portability, simplicity of construction, ease with which it can be introduced and retained in position; and in bringing to view the walls of the vagina and os uteri; it excels the majority of them in the following points:



First. In being self-adjusting.

Second. In putting the vaginal walls equally upon the stretch throughout their entire length, without the use of an additional set-screw, thus simplifying the double movement.

Third. In preventing the folds of the vagina from falling in between the blades, and obstructing the view.

Fourth. In the facility with which the os can be brought into view, by placing the finger upon the posterior extremity of the superior blade, and manipulating it till the object is attained.

Fifth. In being readily withdrawn without closing the blades so much as to cause pinching.

The accompanying woodcut represents the instrument so faithfully that a minute description is deemed unnecessary.

The blades are one and one-quarter inch in width, the lower one four and five-eighths, and the upper four and one-quarter inches in length.

The instrument is neatly constructed of Speculum metal, heavily nickel-plated and highly polished, by George Tiemann & Co., No. 67 Chatham Street, New York.

## REVIEWS AND NOTICES OF BOOKS.

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DIE OPERATIVE GYNÄKOLOGIE MIT EINSCHLUSS DER GYNÄKOLOGISCHEN UNTERSUCHUNGSLEHRE, VON DR. A. HEGAR, Prof. Ord. Publ. der Geburtshilfe, Director der Gynäkologischen Klinik, und DR. R. KALTENBACH, Prof. Extraord. der Gynäkologie, an der Universität zu FREIBURG I. B. Erlangen: Verlag von Ferdinand Enke, 1874, pp. 459 (with numerous illustrations).

WE have here, to our knowledge, the first work of its kind—a historical and descriptive sketch of all gynecological operations and manipulations, instruments and appliances, containing the most approved methods and views of different operators in different countries, down to the latest improvements (June, 1874), written by two professors of the University of Freiburg, in Baden, well known, both in and out of Germany, for their numerous researches in Gynecology. In no treatise on “Diseases of Women” will such a compact and comprehensive account of “Operative Gynecology” at the present day be found. Anatomy, ætiology, and pathological anatomy, as the title implies, are, of course not included.

WE commend and admire the mass of research and the extensive acquaintance with foreign literature evinced by the authors (the names of Sims, Emmet, Peaslee, Thomas, Atlee, Bozeman and other American operators are frequently mentioned); but still we miss a number of appliances and manipulations well known to American gynecologists, such as the various modes of intra-uterine medication by means of the applicator, and the agents thus applied (carbolic acid, iodine, nitric acid, etc.); the use of the *hot* vaginal donche, as first recommended by EMMET (hot vaginal injections being mentioned as useful in *producing* congestion and relaxation, but not in *removing* these conditions, as Emmet affirms); the anteversion pessary, devised by T. G. THOMAS; the manner of applying and twisting the wire sutures, as practised and taught in the N. Y. Woman's Hospital (shield); the closure of laceration of the cervix (EMMET); the use of curved scissors instead of the scalpel in denuding surfaces previous to uniting them by sutures (perinæorrhaphy, vesico-vaginal fistula). The authors, however, can hardly be blamed for these omissions, because the points just mentioned may doubtless be new to many practitioners even

in this country, who have not been so fortunate as to be able to profit by the teachings of the surgeons in charge of that unique institution of its kind in America, the Woman's Hospital in the State of New York. Indeed, many of these minute technicalities have never been described in print by their originators, to whom they have been taught by the experience of years; it is no wonder, therefore, that they have not met the ears or eyes of the authors of the admirable work under discussion.

The illustrations are numerous and excellent, and we can honestly say that we have never reviewed a book which we could more heartily recommend to the medical profession. It is a credit to the scientific and practical attainments of its authors.

We should think that a translation of it (particularly with notes by a competent American gynecologist) would fill a vacancy which has undoubtedly been felt by the majority of the Specialty in this country and England. Better still would be an original work, embodying the contents of Hegar and Kaltendach's book, and the rationale and practice of uterine surgery in its present unsurpassed excellence in America.

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THE COMPLETE HANDBOOK OF OBSTETRIC SURGERY; OR, Short Rules of Practice in every emergency, from the simplest to the most formidable operations connected with the Science of Obstetrics. With numerous illustrations, by CHARLES CLAY, M.D., late Senior Surgeon and Lecturer of Midwifery, St. Mary's Hospital, Manchester, etc., etc. From the third London edition. Philadelphia: Lindsay & Blakiston, 1874, pp. 328.

As the title implies, this little work contains in alphabetical order all the operations and manipulations connected with the practice of an obstetric physician and many of those pertaining to gynecology. It is a useful, convenient book of reference, the illustrations are good, and the book will be found of service to the student and young practitioner, if not to the skilled obstetrician.

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ERYSIPELAS AND CHILD-BED FEVER. THOMAS C. MINOR, M.D. Cincinnati: Robert Clarke & Co., 1874, pp. 131.

This is a very laborious and elaborate essay on the connection supposed to exist between erysipelas and puerperal fever, compiled from reports of epidemics, and based in a large measure on meteorological tables from various parts of the United

States. The several portions of this essay appeared in the *Cincinnati Lancet and Observer*, in the course of the present year, and show an enormous amount of study and care in their preparation. The conclusions at which the author finally arrives, although he does not assert them to be indisputable, are:

1. Epidemic typhus is not always associated with an epidemic of puerperal fever.
  2. Epidemic scarlatina is very seldom associated with an outbreak of puerperal fever.
  3. Epidemic erysipelas is *invariably* associated with an outbreak of epidemic puerperal fever, or *vice versa*.
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GROUP IN ITS RELATIONS TO TRACHEOTOMY. By F. SOLIS COHEN, M. D. Philadelphia: Lindsay & Blakiston, 1874, pp. 78.

This extremely able, thorough and interesting essay is based on a careful study of the published records of more than 5,000 cases of tracheotomy in croup, and treats of the statistics of recoveries as influenced by age (showing only 24 recoveries under two years); of the indications for the operation; the points of importance in connection with the operation itself; the after treatment of the disease and of the surgical wound; and the casualties which prevent recovery. The conclusions at which the author arrives are:

1. That there are no insuperable contra-indications to tracheotomy in croup.
2. That the administration of an anæsthetic for the purpose of controlling the child's movements is admissible in performing the operation, but that it should be used with great caution.
3. That a careful dissection should be made down to the windpipe, and hemorrhage be arrested before incising it, whenever there is at all time to do so.
4. That the incision should be made into the trachea as near the cricoid cartilage as possible, to avoid excessive hemorrhage, and subsequent accidents which may occasion emphysema.
5. That a dilator should be used or a piece of trachea be excised whenever there is any difficulty encountered in introducing the tube.
6. That the tube should be dispensed with as soon as possible, or altogether if the case will admit of it.
7. That assiduous attention should be bestowed on the after-treatment, especially that of the wound, and that a skilled attendant should be within a moment's call for the first 24 or 48 hours immediately following the operation.



THE BUILDING OF A BRAIN. BY EDWARD H. CLARK, M.D., author of "Sex in Education." Boston: James R. Osgood & Co., 1874, pp. 153.

IN this essay, which was originally prepared for, and partly read at, the last annual session of the National Educational Association in Detroit, the author applies the same principle of periodical remission from mental and physical education, which he maintained in his "Sex in Education" as vitally essential to the proper development of the female body, also to the building up and development of the female brain. He contends that a healthy brain must be built up in connection with and from a healthy body, and that a brain which has been stimulated and strained to its utmost capacity, without regard to the condition of the body over which it rules, cannot long remain sound or be considered a healthy organ. While the female brain is as capable of high training as the male, it cannot be forced and overworked, like the latter; and not until it is understood in America, in home, social, and school life, how to appropriately develop "the whole organization, so as to evolve the best brain," will the American woman occupy the exalted physical and mental position for which nature has fitted her. "Because there is sex in body there must be sex in mind, and sex in education."

Dr. Clark cites numerous letters and reports from various medical and educational authorities of high standing, as well as from parents, in support of his opinion, that the American schoolgirl is mentally, and therefore also physically, overworked in the attempt to make her compete successfully with her male contemporaries, and that too little attention, often none at all, is paid to the peculiar physical organization of the female, and the physiological processes inaugurated at the age of puberty. The truth of this statement will hardly be disputed. In conclusion, Dr. Clark briefly relates the school-life of an English girl as an instance of "English female brain-building," which sufficiently explains her physical superiority, at least, over the American girl.

The book is written in the easy, flowing style which we remember well when it was our good fortune to listen to the classical lectures of Prof. Clark, and the importance to the community of the subject which it so ably discusses should secure for it no less attention than was given its predecessor in the same field.

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A PRACTICAL TREATISE ON THE SURGICAL DISEASES OF THE GENITO-URINARY ORGANS, INCLUDING SYPHILIS. Designed as a Manual for Students and Practitioners, with 134 engravings and 55 cases. By W. H. VAN BUREN, A.M., M.D., Prof. of the Principles of Surgery, etc., in Bellevue Hospital Medical College, etc., and E. L. KEYES, A.M., M.D., Prof. of Dermatology in Bellevue Hospital Medical College, etc. New York: D. Appleton & Co., 549 and 551 Broadway, 1874, pp. 672.

WE cannot refrain from saying a few words at least in favor of this excellent work, excellent both in a scientific and practical sense. It is divided into two parts, a genito-urinary, comprising 476 pages, and a syphilitic. Our limited space will not permit us to do more than merely call attention to the numerous excellences of the work; to appreciate them it must be read and studied, a task which the readable style of the book renders a pleasure and not a duty. As pertaining particularly to one of our specialties, we would refer to the chapters on the various congenital malformations of the genito-urinary organs, double penis, absence of penis, phimosis, paraphimosis, deformities of the urethra and bladder, imperforation, atresia, hypospadias, epispadias, hermaphroditism, vesical atrophy, cryptorchidism, masturbation, and the closing chapter on inherited syphilis. The well-known reputation of the authors, and their extensive experience in private and hospital practice vouch for the merits of the book, a careful study of which has convinced us that the authors have well succeeded in the purpose mentioned in the preface of reproducing every fact of practical value in the literature of this department of surgery. The illustrations, type and general appearance of the book are in accordance with the well-established reputation of the publishers.

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THERAPEUTICS AND MATERIA MEDICA. A Systematic Treatise on the Action and Uses of Medicinal Agents, including their Description and History. By ALFRED STILLÉ, M.D., Professor of the Theory and Practice of Medicine in the University of Pennsylvania, etc. Fourth Edition. Thoroughly revised and enlarged. In two volumes. Philadelphia: Henry C. Lea, 1874, pp. 1944.

THIS classical work is so extensively known, and its scientific reputation so thoroughly established, that it seems superfluous to say anything in its praise. After having been out of print for two years it is now given to the profession in an improved and enlarged shape; some two hundred and fifty pages have been added to the text, various chapters rewritten, new reme-

dies added (chloral, croton chloral, bichloride of methylene), and the whole work brought down to the very latest date, the preface being dated "October, 1874." The book is written on the principle expressed in the preface, "that clinical experience is the only true and safe test of the virtues of medicines," and is, in our opinion, the best treatise on the subject in the English or any other language.

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**EXAMINATION OF THE URINE.** By GEO. B. FOWLER, M. D., Examiner in Physiology, Col. Phys. & Surg. N. Y., etc. New York: D. Appleton & Co., 1874, pp. 80.

This little work will be found a very useful "Guide" (as the author in the preface announces it) to the student and practitioner. The clear, concise manner in which the characters of normal and pathological urine and the various tests for their constituents are given will enable the physician to obtain the desired information at a glance, and save him an often laborious search through one of the larger text-books, which have hitherto alone contained the analysis of urine.

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**SURGICAL EMERGENCIES.** Together with the Emergencies attendant on Parturition and the Treatment of Poisoning. A Manual for the Use of General Practitioners. By WILLIAM PAUL SWAIN, F.R.C.S., Surgeon to the Royal Albert Hospital, Devonport. With eighty-two illustrations. Philadelphia: Lindsay & Blakiston, 1874, pp. 189.

A VERY useful, carefully-compiled little work, containing much information imparted in a concise but readable style.

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**NOMENCLATURE OF DISEASES.** Prepared for the use of the Medical Officers of the United States Marine Hospital Service, by the Supervising Surgeon (JOHN M. WOODWORTH, M.D.). Being the Classification and English-Latin Terminology of the Provisional Nomenclature of the Royal College of Physicians, London. Washington: Government Printing-Office, 1874, pp. 210.

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**TRANSACTIONS OF THE MEDICAL SOCIETY OF NEW JERSEY FOR 1874.**

**REPORT OF THE HEALTH OFFICER OF THE CITY AND COUNTY OF SAN FRANCISCO** for the fiscal year ending June 30, 1874.

**THE PHYSICIANS' VISITING LIST FOR 1875.** Philadelphia: Lindsay & Blakiston.

The above reviews and notices were crowded out of the November number.—Ed.

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THE pressure of unpostponable ORIGINAL COMMUNICATIONS for this Number has obliged us to omit the usual TRANSACTIONS OF THE NEW YORK AND PHILADELPHIA OBSTETRICAL SOCIETIES, the QUARTERLY REPORT ON OBSTETRICS, DISEASES OF WOMEN AND CHILDREN, and the QUARTERLY LIST OF LITERATURE, all of which omissions we hope to supply in the next Number.

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COMMUNICATIONS have been received from DRs. JOSEPH TABER JOHNSON, Washington, D. C., on "Peculiarities of Parturition in the Negro Race;" H. LENOX HODGE, Philadelphia, the last paper begun by his father, the late Dr. HUGH L. HODGE, "On Compression of the Fœtal Head by the Forceps and Cephalotribe," completed by the son: GEORGE J. ENGELMANN, St. Louis, Mo., on "The Uterine Decidua, its Structure and Development;" JOHN S. PARRY, Philadelphia, on "Pregnancy and Labor in Epileptic Women," and on "The Use of the Hand to Correct Unfavorable Presentations and Positions of the Head during Labor;" Prof. WILLIAM T. LUSK, New York, on "An Epidemic of Puerperal Fever in Bellevue Hospital."

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